SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

MINERAL STATISTICS OF THE MINING RECORD OFFICE.

SIR,—In reply to Mr. Thompson's remarks in last week's *Mining Journal* in reference to iron ore, pig-iron, &c., it is very evident that gentleman's examination of the volume of Mineral Statistics for 1878, just issued, must have been very superficial. Had he looked carefully at the volume he would have found at page 58, under "Iron ore produce," that the sources of supply stood thus:—

English iron ores ..... Tons	15,726,370
Foreign ditto	1,173,411
"Purple ores"	400,000
Total	17,299,781

Again, at page 71 he would have seen a detailed account of the iron ores imported from Bilbao during 1878, from a Spanish official return, from which it appears that the quantities received by England amounted to 856,038 tons, and by Scotland 47,445 tons, making a total of 903,483 tons from Bilbao.

Having replied to Mr. Thompson's remarks, I would mention, for his information and that of your readers, that since the publication of the Mineral Statistics the Annual Statement of the Trade of the United Kingdom has appeared; from this we learn that of the 1,173,411 tons of foreign ores imported last year Russia contributed 8051 tons, Spain 1,088,862 tons, Italy 48,771 tons, Turkey 3874 tons, Algeria 13,124 tons, and other countries 10,729 tons.

Sept. 3. RICHARD MEADE,
Assistant Keeper of Mining Records.

THE BILBAO IRONSTONE MINES.

SIR,—The Somorrostro ironstone district, which is situated north-west of Bilbao, is the principal seat of the industry. The centre of the district is about seven and a-half miles from Bilbao, and about the same distance from the shipping place on the River Nervion, between Bilbao and the sea. The known deposits of iron ore occur here and there over a large area, some deposits being found quite near to Bilbao, and others 19 miles north-west of it. The principal mass is about 2¼ miles in length by 1¼ mile in width; its thickness has not yet been proved, but the workings have been carried down to the depth of 246 ft. in some places, and 105 ft. in others. The ore is chiefly brown hematite, interspersed with blocks of unaltered spathic ore. It contains from 50 to 64 per cent. of metallic iron in the undried state, about 1 per cent. of manganese, but only a fractional percentage of sulphur and phosphorus. In some localities the ore crops out to the surface, and is then worked in quarries. It is all got by blasting and in open workings. The formation occurs in cretaceous rocks, being in some parts interposed between undoubted cretaceous strata. The ore is supposed to have been deposited by hot springs charged with carbonate of iron.

The conveyance of the ore from the mines to the railways is either in carts drawn by oxen, or by wire tramways, and afterwards by rail to the shipping places. Two systems of conveyance by wire rope are used—Hodgson's and Bleichert's. The arrangement of Bleichert has more recently been introduced; the main ropes in it are fixed, serving as rails for the trams or tubs suspended from them to run on. The trams are drawn by a lighter running rope. The first cost is greater with Bleichert's than with Hodgson's system, but the working cost is less, and it is capable of carrying twice the quantity per day. The cost of transport by Bleichert's wire-rope line is about 2·66d. per ton per mile. There are five lines of railway connecting the mines, or wire-rope lines, with the shipping places. The wagons are filled by hand, and are constructed to tip at the end or bottom. The shipping stages are constructed of timber, the wagons being run out on them singly, then tipped into the vessels through inclined spouts, in one case by a vertical spout over which the bottom tipping wagons discharge, The average cost of the ore per ton on board is nearly as follows:—Quarrying, 1·04s. per ton; conveyance to railway by wire-rope line, ·37s. per ton; filling into railway wagons, carriage by rail, and transhipping, 1·65s. per ton; duty, ·10s. per ton: total, 3·16, or 3s. 2d. per ton. The quantity of ore shipped at the harbour of Bilbao in 1877 was 964,533 tons, and in 1878 to the end of October, 1040,000 tons. The bar at the mouth of the River Nervion is a great obstruction to navigation; practically it stops the entrance during the half of each month. Vessels of large draught can cross it at spring tides only. Steamers drawing 13½ to 14 ft. of water, capable of carrying a cargo of 1000 tons, with engines of 120-horse power, are the best adapted for the trade of this port. The freight of such vessels going back in ballast from Bilbao to Calais or Rotterdam is about 7s. 8d. per ton.

[The foregoing is an abstract of a paper by E. Bourson on the Somorrostro Mines.
M. E.

SALES OF TINSTONE FROM CORNISH MINES.

SIR,—"Observer" writes in the Journal that this has often been matter of surprise to him. It certainly does look strange that such things should be allowed by the "lord," who thus loses about one-third of his dues, as he is only paid on the value of the tinstone to the dressers, or bargain buyers, instead of on the value of the tin after it has been "cleaned, dressed, and made marketable," as expressed in the leases. There may, however, sometimes be tangible reasons for this course. East Pool, for instance, may probably produce more tinstone than the present stamping power is equal to reducing, and it is sweet to be able to work any plan to secure even small dividends at the present time. Why Wheal Agar sells in the stone, having a powerful stamps and extensive dressing-floors, is not so clear. It is clear enough why Wheal Prussia sells in the stone, having no dressing-floors and no place to lay out any, except at the cost of pumping water from a very considereble depth. This mine must go on to sell in the stone until some discovery shall have been made of sufficient importance to warrant the outlay necessary for all this arrangement. The tin as yet found being all in the shallow part of the mine, very near the surface, and none in the deeper workings, which are very poor, some deeper discovery need be made before we can look for any change in the mode of selling the ore. But the ends being driven are also, I believe, very poor, and the shares need be more scattered over the country before any great cost is likely to be undertaken by the present proprietary of Cornish merchants. You seldom catch that class of shareholders to enter into very heavy cost until some shareholders from outside are introduced into the bulk of the shares, who can, when occasion requires, be more conveniently slipped into the Vice-Warden's Court. A very general plan, under similar circumstances, is to sell what tin they can get in the stone, making a great outcry all the while of what an immense amount of money more might be made of this same tinstone if they had a dressing-floor and sump; get up an excitement among themselves about the shares, and run them on the market, buying and selling also among themselves. Then, as soon as a bit of tin is freshly discovered, sending specimens all over the country; and, when the excitement is high enough, letting in the public as heavily as possible. This being done to a sufficient extent, the expense of dressing-floors is at once undertaken, pumping or any other machinery supplied, great things promised on all going to work, and sometimes something is done. If not, however, it is soon found that someone is done; there is some disappointment in the returns. The poor captain has to submit to a plethora of supplies, often of inferior value, at superior charges. Heavy calls come, which are not very freely paid, and in goes a petition to wind-up in the Vice-Warden's Court. The mine is sold for an old song, again becomes the property of the merchants, who are thus prepared for a repetition of the same round, or to break up the machinery, as best suits their convenience. I do not say that this will certainly be the case in Wheal Prussia, but I do not understand this wonderful cry about the sale of 84*l.* worth of tinstone. Everybody knew that this stuff was there, already broken, when the present parties took the mine; that they have not opened any tin ground since, only been taking away a few arches at high tribute, and that all their ends are poor. The present proprietary engaged to put up a 70-in. engine, but they content themselves with driving an adit level. They covenant to dress tin, but they sell it in the stone. They give the world to understand that they, being a "powerful proprietary," are going to work in a grand way, pumping out two neighbouring mines to drain their lode, and they take the first opportunity of publishing a wonderful sale of tinstone which had been broken before, amounting to the fabulous sum of 84*l.* I think that "Observer," instead of having been surprised, knows all about it. SCRUTATOR.

Old Broad-street, London.

MANUFACTURE OF IRON.

SIR,—The elimination of phosphorus from iron being of paramount importance to metallurgists the process of Mr. W. T. Lewis, of Neath, is no doubt worthy of the consideration of readers of the Journal, more especially as the discoverer is well known in the district as an analytical chemist and assayist. The elimination is effected by the agency or chemical action of sulphide of carbon and chloride of sulphur. In treating ore the source of sulphur preferred is iron pyrites and of chlorine chloride of sodium. The pyrites is first converted into sulphide and sulphate of iron, and then decomposed by lime, and dried. The dried mass is now a mixture of sulphide and sulphate of lime and oxide of iron. The chloride of sodium used is common salt. These compounds are introduced into the blast furnace along with the phosphoretic ores, and in some instances, as when the ores are difficult to smelt, the said compounds are first mixed with a proper proportion of argillaceous or clay ironstone or red hematite ore. The result is the complete separation of the phosphorus from the iron, and its elimination partly in the form of gas and partly in the slag. The required proportions of his said compounds and of argillaceous or hematite ore to the phosphoretic ores are determined by the composition of the latter, and in practice have been found to vary from ¼ to 3 per cent. of the first, and from 0 to 10 per cent. of the second.

In applying the process to the treatment of iron instead of ore he used common copperas as the source of the sulphur. The process here consists in the introduction into the iron in a molten state of a properly prepared mixture in various proportions of the several ingredients. This mixture is introduced by being fixed in the casting bed into which the molten iron is run. This bed may be the ordinary sand bed, or a series of cast iron cells or moulds, which latter he prefers. In ordinary cases 1 cwt. of the prepared mixture is found sufficient to dephosphorise, and, where necessary, to decarbonise a ton of pig-iron. The proportion of carbon (when necessary) to the sulphate is determined by the quality of the iron operated on, the iron in the majority of cases being sufficiently carbonised to supply all the carbon required in the operation, and its abstraction thus is essential to the success, and forms part of the operation. In this part of the process the phosphorus in the form of phosphoric acid or otherwise being exposed to the strong action of the chloride of sulphur and sulphuret of carbon, produced by the chemical changes taking place under the high temperature of the iron, is withdrawn from the iron and entirely eliminated, chiefly in the form of gas, while in some instances it has been found in small quantities in the thin slag formed on the upper surface of the ingot. The great elevation of temperature produced by the liberation of oxygen in the cells also contributes to the purification of the iron.

August 25. CHEMIST.

OIL SHALES.

SIR,—Having seen the article in the Journal of August 23, I regret that I must condemn it as misleading, and in general terms contradict it by informing the writer that at present there is no inducement for working shale unless of exceptional quality and cheaply wrought. I know of none such existing in England or Wales. Much has been said of this great Scotch industry. I am sorry to say the few profitable companies in existence are the remnant of many ventures, while I do not believe all those remaining can show favourably at the end of the next financial year, for paraffin oil at 3½d. per gallon in tank is not a cheerful state of things.

From personal experience I can say the distillation of peat is absolutely hopeless, for every 5s. spent would not give 1s. worth of products in return.—*Sept.* 2. J. M.

THE LONDON COAL SUPPLY.

SIR,—The Barnsley correspondent of a contemporary reports last week that many coalowners consider my mode of transport from their pits to London impracticable. I have so exhaustively replied to such statements in the same manner as I have exposed the Great Northern Railway Company, that I challenge them to come forward and state openly in what way it is impracticable. The railway correspondence in your Journal and in Fraser's Magazine has been suspended, but not so in the Times, vide Money Market report of July 12, and Board of Trade Report of July 19 last. The railway interest may clamour to their full extent; the London coal traffic is doomed. I repeat, even "ad nauseam," that quite independent of the coal being shipped in bulk or in sacks, which is perfectly optional, I am prepared to show to the owners of collieries non-contiguous to the Aire and Calder navigation, or the Trent, that by means of a non-patented but practically proved system of road traction over an undulating country their outputs can be delivered into barges even by horse haulage, without recourse to steam, at much under the rate they are now mulcted by rail. I stand upon the merits of the case, and am quite able to annihilate all railway, direct and indirect, fruitless efforts or throes to retain a vestige of their London coal traffic. Their shareholders have a dismal future.

20, *Little Tower-street, Sept.* 3. WM. JOSEPH THOMPSON.

SAFETY-LAMPS.

SIR,—In the Journal of Aug. 30 I note three letters on Safety-Lamps, and to two of these I beg to make the following remarks:—

First, in regard to the letter signed "M. E.," he says that a Davy lamp will explode in an inflammable mixture of fire-damp and air when placed in a current of 6 ft. per second. In the experiments made by Mr. Smethurst and myself at Brynn, and using fire-damp from the Wigan 9-ft. mine, we never succeeded in exploding a Davy lamp in a velocity of less than 7 ft. per second; a Clanny lamp exploded in the same velocity, and a Stephenson will certainly explode in a velocity of under 10 ft. per second. A properly constructed Muesseler is very difficult to explode, even when held in a slanting position. At any rate, such was our experience. On comparing the results obtained by various experimenters when testing the Muesseler lamp an investigator becomes considerably confused by conflicting statements, which receive no explanation until he has obtained full details of the construction of the lamps—for instance, the chimney in a Belgian lamp has a maximum diameter at the top of 10 millimetres, whereas the majority of English made lamps have a diameter of 13 millimetres, and it is, therefore, quite evident that if the proportions differ the results obtained will differ also, and such is the fact.

Secondly, with regard to the letter signed "D. J.," the question that comes most prominently before me is, what is the object of the writer? I can only hope, in the first place, that he is not a member of the Manchester Geological Society, because if he were he would have exercised his claim to membership with better taste by making his observations at the time the paper was read, and when all the lamps experimented upon were open for his inspection, or he would have reserved his remarks until the paper was discussed by the members, and the lamps were again open for his inspection and criticism. However, allow me to tell him that Mr. Smethurst and myself were invited by the executive of the Manchester Geological Society to prepare this paper, and that the experiments were made in the first instance for our own information and participated in by several of our mining friends, without the publicity which inventors would naturally desire.

Neither Mr. Smethurst nor myself have yet figured in the Patent Office, and if we choose to distinguish ideas of our own by our own names it is no business of "D. J.'s" to interfere, and the suggestion his letter conveys is a piece of gratuitous impertinence. I am not aware that the "over meddling" by the Belgian Government in safety-lamps has increased the loss of life in Belgian coal mines, on the contrary, I have reason to believe that the results have been eminently satisfactory. If "D. J." has facts to disprove this by all means let us have them, and if he really wishes for information from me he can obtain it without using a *nom de plume* and indulging in personalities. I would suggest to him that he should occupy some of his spare time in making a journey to Brynn and avail himself of Mr. Smethurst's generous offer to allow the members of the Manchester Geological Society to use his apparatus to make experiments for themselves.

In conclusion, I would further suggest to "D. J." that he owes an apology to the executive of the Manchester Geological Society, if to no one else, for unwarranted statements, and for overstepping the bounds of fair criticism. JAMES ASHWORTH, Mining Engineer.

Southport, Sept. 2.

THE COMSTOCK MINES, IN NEVADA.

SIR,—These mines produce both gold and silver; they are remarkable for the high temperature of the rocks from which the ore is extracted, and the great depth of the workings. The lowest levels are 2200 ft. below the surface, the rocks dip at an angle of from 40° to 60°, and are intersected by eruptive dykes. The average temperature of the strata in the lowest levels is 130° Fahr., and sometimes rises to 139°; the heat even exceeds this in certain narrow belts and in the vicinity of dykes, or where the rocks diorite and propylite come in contact. The high temperature of 157° Fahr. has been observed in these localities. Highly-heated ground is considered to be a favourable sign for the finding of ore. The source of the heat is thought to be volcanic; others assign chemical action as its source, and the heat to be the result of the decomposition of the felspathic mineral contained in the rocks. There occur also in these mines certain cold belts (less frequent than the hot ones); in these the temperature is much below the average given above.

The rocks are usually dry, especially in the lodes, but the cold belts are generally wet, and in other places water at a high temperature sometimes flows into the workings. The high temperature is not due to the depth at which the water is met. It would appear as if the water is often tapped much below its highest level, and then floods the mine by hydrostatic pressure. The Savage and Hale and Norcross Mines have been flooded by water tapped in the 2200 ft. level of the Savage Mine. This water ran into the mine with a pressure equivalent to a head of 500 ft., filling the workings up to the 1700 ft. level—the level of its source. The temperature of this great volume of water was 154° Fahr., and the decomposition of felspathic mineral at the source of the outflow is supposed, on the theory of chemical action, to have raised it to this high temperature.

C. E.

TIN MINING IN AUSTRALIA.

SIR,—The subjoined extracts from an account of a visit to the Vegetable Creek tin mining district of New South Wales may be interesting to the readers of the *Mining Journal*:—

Since 1872, when a man named Caroline discovered the first tin at Vegetable Creek, the place has been the scene of considerable mining activity. The district has had its vicissitudes, although during the time that tin brought a high price many rose from poverty to wealth. Altogether the district, although some money has been lost in it, is well worthy of attention. My first visit was to the Y water holes claim, which is the property of Mr. Alfred Cadell and Mr. Alfred Mitchell; it is almost two miles from Vegetable Creek proper, and is well worthy of notice. As the principal workings are situated at the top of a rise a great deal of trouble has been taken to obtain water. One dam has been excavated close to the work, and into it two water races are carried; one of them, cut in the surface of the earth, fills the dam when rain falls; the other is led from a dam the property of Mr. J. Moore, of Armidale, a distance of 600 ft. The water from this dam is raised by a pulsometre pump a height of 50 ft., and is then carried partly by canvass and partly by galvanised iron fluming to replenish the upper dam. The water from thence is raised by a seme-centrifugal pump to a flume 310 ft. long, by which it is carried to the shaft where the sluicing takes place, the dirt being sluiced straight away from the shaft. Necessity has been the mother of invention, and this method of working is the outcrop of the present low price of tin.

At the time of the visit Mr. Cadell, who is his own manager, had 32 men at work, whose average wage is 7s. a day. Mullock shifters and surface men receive 7s. through. Pickmen underground get an extra 6d. Mr. Cadell is about to put down another shaft, which will be large enough to allow two trucks, holding ½ yard dirt each, to be drawn up and down. He will then be able, with an increase of six men, to do double the amount of work he his doing at present. Some idea of the extent of his claim may be judged from the fact that he has prospected and found it payable in one direction for over 1000 yards, while the average height of the wash is 10 ft. 6 in. and 11 ft. I have never seen a mine more securely timbered; every prop was large, of good wood, firmly fixed in its place, and in symmetrical rows, and yet the ground is of such a nature that it requires no lathing. The wash, though chiefly composed of drift, is yet firm and holds well. The props were 5 ft. apart, 9 in. in diameter, and heavily capped. Mr. Cadell considers that the deposit was formed before the volcanic period, as the true wash was under a false bottom. On examining the wash from the bottom to the top veins of tin could be seen running through it. In some places they were broad and plain; in others narrow and indistinct. Traced even in the flickering candle light, the different colours which these veins presented were very pretty; some of them were black, others red, while white and yellow streaks ran variegated in between. The amount of ground worked out is about 60 ft. square, from which the large amount of 16 tons of ore has been taken. Taking the height of the wash at 10 ft. 6 in. and the square of 60 ft., this quantity makes the average yield per cubic yard at about 25 lbs. of ore, which yields 74 per cent. of solid tin. Owing to the last drought no work was done in the claim till the late rains allowed washing to commence, the whole of the previous two years being employed in very little else but prospecting, opening out, and waiting for rain. Everything is being worked systematically; even the drives are put in at right angles to one another, and with light the claim could be seen from one end to the other.

The next place visited was the Graveyard Tin Mine at the creek of the same name. The present workings at Graveyard Creek constitute only one of the claims belonging to the vegetable Creek Tin Mining Company. One of the claims—the original Vegetable Creek Mine—was one of the richest which the world has ever seen. The wash was nearly pure tin, and might have been bagged as it came up out of the shaft. Nothing like it before or since has been heard of; and as at that time tin was fetching 140*l.* a ton, some idea may be gained of the value of such a claim; it is now nearly all worked out. A few men working on tribute are taking down any places where they find a bit of ground left, and I hear that they are making wages at it. The Graveyard Mine, the present centre of the company's work, is one of the largest on the field, and is still proving profitable to the shareholders. The operations are on a very extensive scale, and at present 70 men are employed, which number he intends to increase as soon as practicable with profit. Mr. O'Daly, J.P., the manager, first took me to the engine-room. The pump is a centrifugal, worked by a Call and Anderson's 12-horse power engine, and can throw 2000 gallons a minute. From there we by ladder climbed to the top scaffolding, from whence a very fine view of the whole workings could be obtained. From this elevated position, 50 ft. from the ground, an idea of the great length of fluming, 2300 ft., was seen. The water forced up an 8-in. pipe to this height is then carried by canvass hosing to the shafts, where the sluicing is being done. An immense amount of ingenuity has been necessary to get the operations to their present perfection. There are two shafts and two sluice boxes working, and everywhere is life and activity. Mr. O'Daly informed me that he only began work again on March 10, before which time he had been idle for six months for want of water. At the present time all of his immense dams are full, and he himself considers that he has five or six months' supply without any more rain falling.

To give some idea of the amount of wealth a mine like this circulates, the following figures which Mr. O'Daly placed at my disposal will show:—The ore taken out of the mines belonging to the

Vegetable Creek Tin Mining Company is 2105 tons 15 cwts., of which 75 per cent. is pure tin. The amount of money received for this has been 103,000*l.*, of which 35,000*l.* was profit divided amongst the shareholders; 30,000*l.* was paid away in wages, 15,000*l.* in carriage, and 13,000*l.* in miscellaneous expenses on the creek. At present at the Graveyard, where the company are now working, 8000*l.* has been spent for plant and machinery, while 50,000 ft. of timber have been used underground. From there I went to Vegetable Creek proper, or the town. This place is much the same as the general run of mining townships; it has not much to boast of either as regards beauty or architecture. On entering it the most promising objects are the immense heaps—mountains they may be termed—which meet the eye in every direction. Indeed, nearly the whole of the site on which the buildings stand have been turned up in search of the mineral. Everywhere signs of excavations and mining are met with, and in one place right in the middle of the street was a man sluicing at what was literally a roadside puddle; he had an old-fashioned wheel to pump with, but, like everyone else just now, appeared to be doing well.

The system of paying for the work done at Messrs. Moore and Co.'s Rothschild Tin Mining Company, which is the finest claim of importance after passing through the town, is well worth consideration. The length of this claim is one mile, and though it has been worked for some considerable time, and is now let on tribute to small parties, there is yet a great deal of tin left to be unearthed. The way that these tributes are carried on seems to be a good one. In the first instance a party of men agree to work the ground, giving their yield to its original holders for a stipulated sum, the owners of the ground to supply engine power and water. The average price of tribute is 23*l.* a ton; what the mineral brings over that sum is the profit which the owners of the ground receive, while the tributers themselves receive that amount as wages for their labour. From what I can learn this system has been found to work very well indeed, far better than the old one of paying wages. In the Rothschild claim over 70 men are employed in this manner, half of them being Chinamen; these latter work, comparatively speaking, harder and longer hours than the Europeans, but yet do not get through more work; they commence at four in the morning, and work as long as it is light, and yet they do not equal the quantity of work done by the white men in eight hours. I am now quoting from several large employers of labour. For this claim one of Clayton and Shuttleworth's 10-horse power engines performs the pumping, and the water is conducted round the different tribute parties by ground flumes and sluices, each party paying Moore and Co. at the rate of 30*s.* a week for the water, they finding the engine power and fluming. One party of Chinamen working consisted of 13, and I was informed that during one month they had received 150*l.*, which was their amount of wages; not so bad for Chinamen. While here I paid a visit to their huts, and it would surprise many to see how clean everything was kept. It is a fact that in this particular they were far in advance of the Europeans; many of them had their trunks or beds remarkably neat; white curtains were draped on each side, some of them tastefully drawn and written on in Chinese characters. The bed clothes were folded up as carefully as any housewife would do it; neither did they appear to be so frugal in their living; hanging up in their kitchen were vegetables and fresh meat, and I heard it stated that they indulged in five meals a day. In several places I noticed that they still stick to their ancient customs as regards pumping. Two of them standing work a treadmill with their feet, which turning a wheel draws the water for sluicing purposes. In the Rothschild claim there was over 1000 ft. of fluming. Not only were there tributes taken out in this claim to work new ground, but the hopperings, tailings, and headings were alike being reworked.

There are at the present time 30 companies and parties returning tin in this district, and fair returns are being made. The two claims of Messrs. Moore and Co. head the list as regards the amount of ore taken out, Messrs. Moore and Co., Vegetable Creek Tin Mining Company, being 2175 tons, and the Rothschild 728 tons 18 cwts. Below this claim is Messrs. Hall Brothers Six Mile, which is under tribute to Chinamen, all of whom are doing well. Hr. Hall has also several other large interests, among which are some extensive and valuable ones at Kangaroo flat. The Great Britain was also at one time one of the first and most important mines, but a tramway which, though perfectly useless, was put down at a cost of 18,000*l.* almost ruined the company, notwithstanding that 1931 tons of tin were taken out of the mine; it is now let on tribute to small parties of men. The figures relating to the returns have been most carefully collected, and show that the total for the 30 has been 14,577 tons 15 cwts., which shows that tin mining in New South Wales is becoming a prominent industry in the colony. R. D. A.

Sydney, July 5.

THE TREATMENT OF TIN ORES.

SIR,—Those interested in mining must have been much interested in the perusal of the letter of Capt. Southey on the Treatment of Tin Ores which appeared in last week's *Mining Journal*. There is no doubt Capt. Southey has hit at least one nail on the head by showing us how to make the most of what we bring to grass. Recently I had the pleasure of looking over several mines in Cornwall, among the rest Capt. Southey's mines, at which care and economy are the striking characteristics.

At Wheal Jane, although yet in a transitionary state, intelligence is manifested over muscle even in the simple elevator which enables one man to attend to the feed of the stone-breaker and tram the wagon from beneath its delivery shoot to the stamps. The system by which the tramways are arranged from the shaft to the stone-breaker, and from thence to the stamps, at once shows that Capt. Southey can not only give good advice but carry his ideas into practice. One thing struck me forcibly in each of his mines was that he seems to have the knack of getting and keeping good under-agents in each department, and all seem to work together.

When looking over Wheal Jane, in speaking to the intelligent captain dresser (Hall) of the tin sometimes lost, I asked him how they fared? His reply was, "Anyone is at liberty to try." I said, "But has anyone?" The reply was, "One party did try, stopped a few weeks, and then left; no one has come since." From appearances all tin possible is saved; had it not been the returns would not enable them to sell the tin they do.

I must not pass over West Chiverton, where I found extensive repairs and improvements had taken place since I saw it some eleven months ago, and I am sanguine of the old mine being yet once more among the best mines of the country.

The adjoining mine also—East Chiverton—is well worth a visit from anyone who takes an interest in the underground work, this being an undeveloped mine as yet (although some rich work has been sold recently and more remains to be made money of when prices improve a little more); there is not much to be seen at surface, except one of the best 50-in. engines in the county with the usual needful offices; and here, I may say, is a striking difference between a well-conducted Cost-Book mine with a captain who has the confidence of the adventurers, and the bulk of Limited Companies, the directors of which—I speak from sad experience—seem to think that a large display of surface works makes a mine, but find that after the money is spent they have the mine to open, or else the machinery is useless; then comes the usual reconstruction, and the almost inevitable wind-up.

It is to be hoped that those with a little spare capital will be careful now before they waste it in any of the many "Limited"—in chance of success—ventures that undoubtedly will shortly be brought out. There are plenty of good mines that have weathered the storms of late years, and only need a little of the cheering influence of better prices to make them prizes; let investors look out for these, there is plenty of time for new ventures, more especially avoid foreign mines. Let us keep our money at home, there is quite as valuable mineral ground and a great deal more honesty in Old England than can be found as yet even in the land where the "Saints" dwell.

But I have strayed from East Chiverton. Here I found on going underground a strong well-fixed ladder-way, good roomy shaft and pitwork—a model of workmanship, working without a jar or vibration, and here I may say that changing this pitwork 15 in. instead of 10 in., done during the late awful winter and spring without a hitch or the water gaining an inch on them, shows that the miners of Cornwall can yet hold their own against the world. The change of pitwork is in consequence of the prospects at the present bottom level leading the adventurers to see the advisability of sinking to deeper levels, and to prevent any chance of flooding it was thought best to take advantage of the present low prices and get pitwork that would provide for any contingency. It is a pleasure to anyone interested in mining to see how it is done. The sinkers were working with a will, and I may notice that Capt. Southey has departed from the usual customs in two or three points. The shaft is following the dip of the lode, yet not on it, thereby continuing in good firm ground, at the same time not running away from the lode. The next level is to be 16 fms. below the present, thereby not only proving the lode to a greater depth than the usual 10 fms., but allowing 16 fms. instead of 10 fms. of productive backs.

The sinking is let to the men at a set price per fathom, who are in consequence working well and making good wages, as they know the more they do the better for themselves, and so it is for the adventurers. They told me they took out 3 fms. in July, and intended to do more last month. Now, this is a proper way—let the men feel that at the same time they are working for the adventurers they are working for themselves. I only wish the lords would act on the same principle and let adventurers feel that they are not working entirely for them and not for themselves. Many of the large landowners are now finding out that big rents and hard conditions, which for a time brought them large profit, has at last almost killed the goose that laid the golden egg. No doubt high farming has tended to prolong the life of the goose, so improved machinery will yet make mines pay. But in the long run light dues and reasonable conditions will be most profitable to all parties.

It must not be supposed that the above mines are the only well-managed mines in Cornwall, but I have so far trespassed on your space I must not notice them now. Suffice it to say that the three mines I have noticed I did not see excelled in miner-like work or careful management.—*Stanley, Sept. 2.* J. B.

THE SCIENCE OF MINING.

SIR,—In my previous letters on this subject I have treated principally of some of the more prominent physical features of rock and vein formations; but mining has a science besides this, as the term mining implies active operations addressed to specific objects, whether occularly known or speculatively apprehended. The science of this part consists in the most suitable application of means to the accomplishment of purposes—the achievement of the largest and most satisfactory results by the most simple methods. There can be no economy of time or money if efficiency is lacking in the instrumentality employed. It would be useless to argue in favour of economy that in the prosecution of an enterprise only so much money was being expended unless with strict and pointed reference to what was resulting therefrom. It is a true maxim that "what is worth doing at all is worth doing well." The proper execution of necessary work is not usually the most expensive; on the contrary, it is the most economical. A temporising policy in mining generally implies deficiency; it may be pecuniary, or in respect of the necessary judgment and knowledge of how to proceed, or it may arise from a combination of these causes. If there is a deficiency of funds, so that a well-organised plan of working cannot be proceeded with, it is more than likely that money will be frittered away in fruitless efforts to accomplish something for appearance sake, or in improving schemes unequal to the requirements, which are worse than useless, as things of such sort become obstructive, and in addition to the cost of their erection there is the loss incident to the waste of material in removal, and the time required in effecting it; but a procedure of this kind may not be due to ignorance on the part of the chief agent or his subordinates, but from circumstances over which they have no control, the powers above them requiring the prosecution of measures having the most impressive resemblance to real *bona fide* undertakings. But, on the other hand, if the funds are ample for all necessary purposes, provided only that they are properly applied, and there should then be a lack of knowledge and judgment on the part of the management, whatever may be the resources of the mine when developed, irredeemable errors and mistakes may be committed as not only to vitiate but wholly frustrate what otherwise might have been an imposing success.

Mining may be said to begin with nothing—nothing developed. The miner must precede mining, so also must the theatre of its operations—a something to act, and a something to act upon—with definiteness of purpose and expectation as to the results. The expectation of the miner rests on probability, whose realisation is his success and hoped for reward. If he had not this well-grounded expectation there would be no sufficient stimulating motive to induce him to make the outlay both of time and money necessary to accomplish the purposes he has in view, and this presupposes that some definite idea is entertained as to the value and capacity of the object or objects in order to sustain in hope the expectations formed of it or them; and as there is and must be an inevitable comparison of values between what is procured and the cost of procuring it, economy becomes an essentially important factor in the measure of success, as what is saved in the cost of procuring adds so much to the value of what is procured. Knowledge is the prerequisite of economy. Knowledge of what—of the several practicable methods which are commonly resorted to in such and similar pursuits, and the ability to descern and determine which of the various methods, if either, or any modification thereof, is best adapted, most efficient, and most economical to meet the special and general requirements of each individual institution or case. Niggardliness, through ignorance of the proper methods and appliances requisite to be employed in the prosecution of certain definite designs, is not economy, but very frequently the reverse, and not only so, but a prolific source of disaster. The mind, enlightened by practical and scientific knowledge, looks beyond the present, forecasts the future, and provides for contingencies which may probably occur during progressive advances on the lines determined. Inability to foresee—that is, to anticipate—future events is an evidence of defective reflective vision, whilst its consequences are numerous, deplorable, and disastrous. He who sees nothing beyond the present may be at any moment overwhelmed in a crisis from which he may never be able to extricate himself or his concern. Too many persons entrusted with the management of mines appear to overlook the fact at the early stages that mining is an eminently progressive enterprise, and in some instances with comparative rapidity; and having made provision only with respect to the present, soon find themselves beset with troubles and embarrassments, and not long after become the victims of a self-torturing conviction that they have stultified themselves by an egregious display of incongruous ingenuities.

An important error at the early stages of mining—such as the sinking of an engine-shaft in a wrong place, or the erection of inadequate machinery, whether for the development of the mine or the treatment of its produce in preparing it for the market, are cardinal errors, inflicting injuries which are not only constant but ever increasing in their baneful consequences, until they attain proportions too oppressive to be borne when its collapse becomes inevitable. It is very frequently said "a good mine makes a good captain," but that is not necessarily true, as it is not the mine which makes the captain, but the captain which makes or unmakes the mine. It is true that a very inferior miner may sometimes succeed to a good mine either by stumbling on the wealth himself or supplanting by intrigue the real discoverer, and may, therefore, be credited with abilities he does not possess, but it is not because the brilliancy of success is a reflection of his abilities that he shines, but because he himself becomes the recipient and medium of the light reflected by the success he was fortunate enough to achieve. Instead of good mines making good captains, I am rather of the opinion that in very many instances the reverse is the case.

I endorse the maxim that necessity is the parent of invention, and I think we have had ample proof of its soundness in the improvements which have been made during the recent unprecedented depression in the metal markets. It is to be hoped that the economies of mining will not be lost sight of when the good times shall have returned again, but that the lessons taught, and in some instances profited by, will still be improved upon. It is very well known that the term economy is in too many instances used as a word to conjure with, but niggardliness, as I have already stated, is not economy; on the contrary, it is the most wasteful and useless expenditure that can be made in any pursuit. Those men who are endlessly harping on economy without being able to set in juxtaposition to it some creditable effects in the shape of developments and mechanical constructions other than crude makeshifts of the most inefficient and ephemeral type, are not the men usually looked to to make good their pretentions. It may be taken for granted in mining, as well as in all other pursuits, that all those persons who pretend to perform efficient services with inadequate means may be safely relegated—whether entitled to such a distinction from ignorance or design—to the category of humbugs, for such they are, and nothing better. It is an evident axiom that producing causes must be greater than their effects, and it is also apparent that where the mind is earnestly and intensely exercised in the production of anything there can be but a small margin between the thing produced and the producing cause of it, and hence the former may be regarded as at least an approximating index of the latter in its force and capacity for efficient performances.

It is proper I should here state that the reference in the opening sentence of this letter is not to that published in last week's Journal under the same heading, as that was merely in reply to the remarks of "Justicia" three weeks since. It will be remembered I was writing on the subject when I was interrupted by the windmill escapade, and an unjustifiable allusion in the advocacy of that bubble scheme to mines which I have no doubt excite the envy of its author—one of which, and not the least, I have the honour and good fortune to be officially and otherwise connected with, but the reference here is to the last of my previous letters on the subject—that published in the Journal on June 28. This letter was written immediately after, and intended as its successor for publication on July 5.

Blanrwst Lead Mine, Aug. 27. ROBERT KNAPP.

ROCK-BORING MACHINERY.

SIR,—There is no doubt about it, more mechanical aid is required underground in our mines. We must more speedily open out our ground, and this can be done by the use of boring-machines; but one great hindrance to their adoption is the cost and maintenance of the ordinary power machines. It is, therefore, with much pleasure I notice the letter of "Tributer," in last week's Journal, who introduces a subject that would well repay ventilating, and I trust that those who are interested in the invention will give us all the information they can.

The letter of Messrs. Jordan and Co., the makers of the hand-power drill, is also not without interest, as it points to the fact that they have confidence in their drill. I trust they will allow me to make a suggestion to them, this—would it not pay them to supply their machines at (say) one-half the price at present charged? Did they do so there would not be a mine in the country but would try them, and in the long run Messrs. Jordan, as well as the mines, would be the gainers. I do not presume to say what profit they have on their machines, but when once the plant is provided the number turned out it is that pays. A point to be considered in the make of mining tools is the "get-up," "finish," or "trade," as it is called. My idea is that the cost of many of our mining appliances is uselessly much increased by the amount of polish and finish on parts that after one day's work are no better for it. Now, finish is all very well on a ladies' sewing machine, or such like, but mining engines and machines can do without it. Let us have for them good sound material and workmanship, with less paint, less polish, and reduced cost.—*Staveley, Sept. 2.* J. B.

NEW CALEDONIAN NICKEL.

SIR,—There was much excitement some time since with reference to the great discoveries of nickel in New Caledonia, and at the time the company was formed in this country it was stated that a contract had been entered into at Paris with some company, the name of which I forget, for the purchase of any quantity of the ore at a fixed price, which price left a fair profit for the miners, and appeared likely to cause the metal to come into the market at a much lower price. But what has surprised me in the matter is that so little has since been heard either of the New Caledonian mines or of cheap nickel, and I now see in last week's *Mining Journal* that during the whole of 1878 Great Britain only produced 99 tons, of the value of 617*l.*, or under 6*l.* 4*s.* 8*d.* per ton, which, taking 10 per cent. ore at 25*l.*, would only represent about a 4 per cent. ore, or in other words, that the entire kingdom only produced 4 tons of metallic nickel.

My special object in writing is to endeavour to ascertain whether this small home production is due to the New Caledonian ore driving the British out of the market, or to the neglect of the industry in this country. I have always understood that the New Caledonian ore is of great purity, and of special character, but it was also stated that some equally rich ore existed in this country on the estates of one of the dukes—the Duke of Argyll, I believe—which could be brought into the market at a very low price. If this be true, why is not attention given to the matter, for while our miners are so badly employed as at present it would be a great advantage to them if nickel mines were opened to replace the copper and tin mines closed.

But it is probably the limited demand for nickel which has led to its neglect, in which case I should like to be permitted to state that the late Crace Calvert, who it will be remembered gave much attention to alloys, told me that there was an alloy of nickel and copper which could be quite as readily worked as ordinary nickel silver, but which had the appearance of standard gold. He predicted that this nickel gold would at some future time come largely into use for works of art, although at the time nickel was too costly. The alloy was far more beautiful than ordinary bronze, and not very liable to tarnish, but it had the great advantage that the tarnish did not seem to proceed beyond a fixed point, and that then the appearance was far superior to either oxidised bronze or oxidised silver. The matter certainly seems to be one worthy of the attention of those who have facilities for developing the idea.

Aug. 25. NICKEL GOLD.

PENSTRUTHAL CONSOLS.

SIR,—I presume the reference in your Notice to Correspondents to Mr. Ashmead's letter in the Journal of last week is intended as a justification of the exclusion from your columns of other letters than mine on the above subject. It must be satisfactory to distant shareholders to have Mr. Ashmead's assurance that large shareholders are gentlemen of integrity and honour; but it would add greatly to the satisfaction if information were given on one or two points. For myself I should be glad to know whether the mine has been sold, and if so to whom, and at what price, and whether the purchaser or purchasers will afford distant shareholders an opportunity of joining a new company on equitable terms?

Sept. 3. A DISTANT SHAREHOLDER.

WEIGHTS AND MEASURES—THE TON OF 21 CWTS.

SIR,—Referring to my letter published in the Journal of to-day, allow me to point out that the word printed "central" ought, of course, to be "cental." Permit me, further, to correct an error in the fifth paragraph, which, through the omission of a word and the alteration of a stop, is somewhat unintelligible, and liable to be misunderstood. It should read—"Hence a suitable and recognised unit is already in existence; and *although* I, for one, would prefer the radical reform involved in the adoption of the metric centner and ton, I should rejoice at the simplification which would result from the abolition of the 21 cwts. system, and the adoption of the cental and the ton of 2000 lbs. The Council," &c. The assimilation of the pound to the half kilogramme is, I fear, too much to expect at present; but let us at all events secure, if possible, the smaller mercy above indicated, and the benefits resulting therefrom will doubtless

lead to a better and more practical appreciation of those which would be derived from a truly International system. REFORM.
Aug. 30.

MINING IN LLANARMON.

SIR,—I like to read the articles week by week of your North Wales Correspondent. He is so clear, pointed, sharp, and practical in his remarks that I am sure your readers generally feel great interest in following him from one portion of the Northern Principality to another. He has also a very nice way of hitting the weak point of an argument or description in a few words, so much so as to set your readers thinking seriously upon the point he hits. I think this a good feature in a special Correspondent, as it assists very much those who are not well versed in the subject which may be under discussion to devise means whereby they may come to right conclusions, and either confirm themselves as to the correctness of what they may have in hand or otherwise, and thus prevent themselves from being led into serious mistakes, which they may never be able to correct as long as they shall live. I quite agree with his remarks in this week's Journal where he says—"It would be a capital thing if * * * there could be a series of field lectures on mining in the midst of our chief mining districts." Just so. It is one of the things in mining devoutly to be desired. But who is to lecture? Are the lecturers to be paid or unpaid? In either case to whom are the lectures to be given—the miners, the investors, or both? If the lecturers are to be paid who is to pay them? At what time of the year could the lectures be given most advantageously? "The absence of practical suggestions" in this matter "is to be regretted" from your North Wales Correspondent. I have no doubt in my own mind that if anything of the kind could be carried out it would do a great deal of good to investors, landowners, miners, and the population generally, and of Llanarmon particularly.

For myself I should be delighted to attend a field or open-air lecture on "Mining in Llanarmon." It would be an interesting sight to see a gathering of men of means from north, south, east, and west, and the miners of the district with their tools in hand to illustrate practically the remarks of the lecturer, either on surface, in "flats, veins, sharps, or swallows" from the mines in Llanarmon. And I feel sure in my own mind that if such a meeting could be held with the object of showing whether "flats" are formed in thin shale beds or decomposed limestone or other rocks, the dimensions of some of the principal of them, the proportion of metallic ore to the whole mineral contents of the flats, the relation of the flats to true lodes, the quantity of lead ore extracted from a given space of flat or lode, "and illustrated by reference to particular mines," it would be just the thing. Then "practical wisdom" could be brought to bear in the midst of the considerable correspondence there is in the Journal "relating to North Wales." and especially "in the letters relating to the Llanarmon district." Now, the practical way of looking at this matter in my opinion is that field or open-air lectures, if they could be carried out, might do a good deal of good, and give a great deal of information, but in the absence of them people who wish to invest in mining have to depend upon certain individuals, expert in their profession, as mining engineers and scientists. And I am sure there are men of this description in the Flintshire and Denbighshire district, and particularly in Llanarmon, who will safely guide intending investors in laying out any money they may desire to spend in mining operations. It might be considered inviduous to mention names, and without doing so I can sufficiently indicate the character of the engineer by referring to the captain of the Lady Ann Mines, the captain of the Lead Era, and the captain of Bodidris Mines, all men who have had large and varied experience in lead mining. I may here say, as I think I have previously said perhaps in other words in the Journal, that those who have money to invest should themselves visit the property in which they wish to invest, in company with some experienced miner in whom they can trust, and make their own inquiries from those in authority, and act in accordance with the value of the information thus obtained. I may say that is the course I pursued myself with respect to a lead mining property in Llanarmon, and up to the present I have every reason to think the course pursued was a judicious one, as I have prospects which promise to show that it will be the best investment I ever made.

Before I finish may I ask your North Wales Correspondent if he can kindly add to the information of your readers by giving in a few weeks from now a list of a few of the mines of the past in the Llanarmon district, and the amount of money paid in dividends to the shareholders, and the capital invested in such mines. Such statement would very much interest an— ENQUIRER.
Lancashire, Aug. 31.

MINING IN LLANARMON.

SIR,—The accompanying lines have been suggested on spending a ten-days holiday in this district in search of health, combined with a desire to see the workings of lead mines in the neighbourhood, and the writer will be obliged to the Editor of the *Mining Journal* if he can find a place for them. ENQUIRER.
Lancashire, Aug. 26.

MINING IN LLANARMON.

Men of means come forth
From East, South, West and North,
To see a noble band,
With pick and spade in hand,
Ready to work
In Llanarmon mines.

Lead you can see in front,
Where men have borne the brunt;
Lead you may see behind,
Better than gold to find;
Lead in the "heading" walls
Of Llanarmon mines.

Lead to the back of you,
Lead to the side of you,
In shallow and deep
Where workers stand and creep,
To bring forth lead
From Llanarmon mines.

Come to this lovely vale
And find lead in every dale,
Guided by worthy men
Who can use tool and pen,
Such as Francis and Ede
At Llanarmon mines.

I'm longing again
To view Llanarmon plain,
And think of the lead
That is laid in its bed,
Some day to be raised
Through Llanarmon mines.

[For remainder of Original Correspondence, see to-day's Journal.]

THE CRANSTON DRILL IN YORKSHIRE.—In lead mining judgment does a good deal, but good luck does quite as much. It can only be observed that the necessary conditions are present, and the ore may be discovered; the rest is happy chance. Many stories are told of the hazards of lead mining. In one instance a drift had long and drearily been opened, and no lead. At last a huge lump was picked up, and the miner, besmeared as he was, flung himself on horseback, and galloped with the glad tidings to the gentleman who was most interested. They never found another piece. The mines on Craven Moor are divined into what are known as the West Craven Moor, where the development has been going on about four years, and the East Craven Moor, where the development has been going on during two years. The history of the former seems destined to be exceeded by that of the lattet, though the first has in every way exceeded the expectations of the investors. The West Pateley Mines too, on Greenhow Hill, had been singularly productive; and the discoveries in connection with them excited a great deal of attention at the time they were made. Seldom has it it been the lot of the miner to meet with continuous ore bodies with an easy and economical yield of from 5 to 10 tons per fathom. From the year 1796 until 1876 there had been no well-directed efforts at the Pateley Lead Mines. Up to a century ago they had been highly remunerative; but the water flowing in with overwhelming force, operations ceased. A few years ago a deep main tunnel was commenced, and, under the guidance and skill of Mr. Williams, M.E., it was soon completed. Three years of energetic working saw the difficulty removed and the mines drained into the tunnel, leaving them dry to a depth of 50 fms. The work cost about 20,000*l.*, but it put those who had adventured their money in possession of a plenteous supply of lead ore, and laid the foundation of an extensive industry. At East Craven Moor Mine, Mr. J. G. Granston's air compresser and rock-drill, frequently described in the *Mining Journal*, has been introduced, and it appears that the company are so satisfied with their working that they have ordered additional ones to be put down at the same mine. At East Craven Moor the drill is working in one of the hardest formations, consisting of compact solid limestone, without joint or opening. Some of the best miners in the neighbourhood are employed in the mine, and before the introduction of machinery they bored as many holes per week as could be expected. But during the few weeks the rock-drill has been in operation it has done 150 per cent. more work than could be done by hand labour, and at a cost of 10 per cent. less than that of hand labour. The entire machine is inexpensive, is easily manipulated, and considering the work it has to perform stands a remarkable amount of wear and tear. At the Eberhardt and Aurora Tunnel, which is in one of the silver mines of Nevada, a similar plant to that at East Craven Moor is at work. The tunnel is 7 ft. by 9 ft. at the face, and already Mr. Cranston's drill has driven over 5000 linear feet, the average rate of progress having been at the rate of 220 linear feet per month.

MINERAL STATISTICS OF THE UNITED KINGDOM FOR THE YEAR 1878—No. III.

IRON ORE.—The total production of the iron mines of the United Kingdom in the year 1878 was 15,726,370 tons, against 16,692,802 tons in the previous year, showing a falling off in production of all varieties of iron ore of 966,432 tons. The output of the iron mines of the kingdom is given, as in previous years, under two heads—iron mines not under the Coal Mines Regulation Act and argillaceous carbonates and blackband ironstone worked under the Coal Mines Regulation Act. In the first group is included those returns of iron mines under the Metalliferous Mines Regulation Act and others not under such inspection, from the fact of the stone being dug in open workings. The districts notably connected with these latter are situated in the counties of Northampton, Lincoln, Wiltshire, and Oxfordshire, in the aggregate yielding a tonnage in 1878 of upwards of 1,960,000 tons of the hydrated oxide of iron. These ores are wrought inexpensively, and put in trucks on rail at prices varying from 2s. 6d. to 3s. and in a few cases 4s. per ton, the ore containing from 30 to 40 per cent. of metallic iron, and losing in weight by calcination about 33 per cent. In the annexed statement appears the detailed production and value of ore obtained in each of the following districts in the year 1878, giving an aggregate of 10,320,593 tons:—

Counties, &c.	Quantities.	Values.
Cornwall .....Tons	1,308 10	£ 879 16 0
Devonshire	4,493 0	2,336 10 0
Somersetshire	43,115 6	30,180 14 0
Gloucestershire	74,761 11	43,876 18 0
Wiltshire	84,756 0	16,951 0 0
Oxfordshire	6,240 9	946 5 0
Northamptonshire	1,189,443 14	170,303 12 0
Lincolnshire	683,865 15	85,875 18 6
Staffordshire, North	25,922 0	12,960 0 0
Lancashire	984,781 19	601,891 13 6
Cumberland	1,357,886 18	899,484 9 0
Yorkshire, North Riding	5,605,639 19	910,739 7 3
Northumberland and Durham.	35,619 0	21,371 0 0
North Wales	378 0	198 9 0
So. Wales & Monmouthshire	56,639 0	26,673 17 0
Ireland	156,834 0	74,809 3 0
Scotland	8,808 0	6,089 17 0
Isle of Man	100 0	50 0 0
Total	10,320,593 1	£2,906,618 10 0
Iron ore, Argillaceous and Blackband, worked under the Coal Mines Regulation Act	5,405,777 0	2,702,888 10 0
Total	15,726,370 1	£5,609,507 0 0

The argillaceous and blackband ironstone obtained from the coal measures, and returned to the Mining Record Office, was derived from the following coal fields:—

Counties.	Quantities. Tons.	Value. £ s. d.
ENGLAND.		
Gloucestershire	500	250 0 0
Shropshire	321,328	160,664 0 0
Warwickshire	57,222	28,611 0 0
Derbyshire	175,260	87,630 0 0
Nottinghamshire	12,250	6,125 0 0
Staffordshire, North	1,076,520	538,260 0 0
Staffordshire, South	587,874	293,937 0 0
Cheshire	500	250 0 0
Yorkshire	370,405	185,202 10 0
Lancashire	1,557	778 10 0
Durham and Northumberland	4,525	2,262 10 0
WALES.		
North Wales	43,082	21,541 0 0
South Wales	318,399	159,199 10 0
SCOTLAND.		
East Division	713,277	1,218,177 10 0
West Division	1,723,078	
Total	5,405,777	2,702,888 10 0

Of the production of South Staffordshire, the Birmingham Canal Navigation carried in their own district 564,507 tons of ironstone. The average value of produce in 1878 of clay and blackbands is 10s. per ton, compared with 12s. the previous year. In addition to this quantity there appears a further source of supply in the residue known as "burnt ore," obtained from the metal extraction works from cupreous pyrites, the copper and sulphur being eliminated. This residue in 1878 amounted to 400,000 tons, and is known to yield metallic iron in considerable quantities, Mason's pyrites giving 67 per cent., the Tharsis about 62 per cent., and Buitron 66 per cent.

The ores imported during the year 1878 amounted to 1,173,411 tons, of the value of 1,162,851*l.*, compared with 1,142,308 tons, of the value of 1,256,069*l.*, in the previous year. Thus, the total of all varieties of iron ore, burnt ores, and imported ores, these latter containing a high percentage of metallic iron, amounted in 1878 to 17,299,781 tons, against 18,250,110 tons in 1877, raised and smelted in the iron-works of Great Britain. A general falling off is observable in the prices of iron ore, mainly due to the depressed state of the iron trade. A diminution in the quantities carried by railway and distributed over the several districts also appear, and will be seen in the following statement for the years 1878 and 1877:—

Railways and canals.	1878.	1877.
Midland .....Tons	898,384	..Tons 862,468
Manchester, Sheffield, and Lincolnshire ..	298,488	 293,437
North Staffordshire	308,466	 333,504
Furness, from Lancashire	879,480	 902,836
" " Cumberland	946,782	 1,191,392
Whitehaven, Cleator, and Egremont	1,052,001	 1,216,816
North-Eastern	4,999,448	 5,547,821
Great Western	56,111	 73,236
Trent and Mersey Navigation	92,209	 108,413

In the aggregate of the above quantities—8,334,497 tons in 1878 against 9,374,018 tons in 1877—a falling off of 1,039,321 tons is accounted for, the only railways carrying an excess in 1878 over 1877 being the two first named, carrying ore from Northamptonshire and Lincolnshire.

PIG-IRON MANUFACTURE.—As previously stated, the total quantity of iron ore returned as smelted in Great Britain in 1878 amounted to 17,299,781 tons. Engaged in the reduction of which 499 furnaces were more or less active during the year of the 948 furnaces built in England, Wales, and Scotland. Of the number of furnaces in blast the following indicates the proportion in each of the years 1877 and 1878:—

	1877.	1878.
England	368	344
Wales	63	60
Scotland	109	94
Total	540	498

Before referring to the details of pig-iron produced in the several metallurgical districts of the kingdom, it will be some what interesting to trace the several varieties of ore obtained, their character, and the formations in which they occur most abundantly. For example, taking the carboniferous or mountain limestone in which occurs extensive deposits of red hematite in the Furness and Whitehaven districts, spathic and brown ores in the Alston Moor and Weardale, brown ores in Dean Forest and Gloucestershire, these districts furnished in 1878 some 4,889,404 tons, in which is included 1,123,772 tons of clayband and 1,312,583 tons of blackband, the produce of Scotland, nearly one-third of the total ores raised. The argillaceous carbonate of iron of the marlstone or middle lias, fully developed in the Cleveland district of the North Riding of Yorkshire, and some outlying deposits of brown oolitic ores in Oxfordshire, at Adderbury, furnished 5,611,880 tons. In the Brigg, Scunthorpe, and Frodingham districts of North Lincolnshire, in the lower lias, the produce in 1878 of hydrated oxide of iron was 683,865 tons. The produce of Westbury, in Wiltshire, being obtained from the coral rag of the middle oolite, and that of Northamptonshire from the lower oolite, amounted in 1878 to 1,189,443 tons. The ores obtained from Devon, Cornwall, and Somerset occur in the rocks of Devonian age, and in 1878 amounted to 48,966 tons, but are capable of a wider development whenever the demand may arise. The Silurian formation, reposing on the Cambian, is also known to yield ores of red and brown hematite in the Skiddaw slate and granite of Ennerdale and Eskdale, in Cumberland, and of brown and spathic ores of iron in the same rocks in the Isle of Man, though the production in recent years is not considerable. The coal fields, at one period furnished fully two-thirds of the ironstone smelted in Great Britain, are not nowadays so extensively wrought, inasmuch as the iron deposits developed in recent years, and the great increase in the imports of hematitic ores from Spain and other countries rich in metallic iron, and obtained at a moderate cost, furnishes the necessary supplies to our ironworks. The iron ores imported in 1878 amounted to 1,173,411 tons, of the value of 1,162,851*l.*, being at the rate of nearly 20s. per ton, and containing from 55 to 65 per cent. of iron. The ores were imported from the following countries, and the quantities and value appear side by side:—

Russia	Tons	8,051	£ 49,328
Spain		1,088,862	1,021,455
Italy		48,771	46,104
Turkey		3,874	20,107
Algeria		13,124	14,783
Other countries		10,729	11,074
Total		1,173,411	£1,162,851

The summary of pig-iron produced in the year 1878, with the number of furnaces built in each district, and the number in blast, and side by side for comparison the make of pig-iron in 1877 appears in the annexed statement:—

Counties.	Furnaces. Built.	Furnaces. In blast.	1878. Pig-iron. Tons.	1877. Pig iron. Tons.
ENGLAND.				
Northumberland	4	1	660,323	734,438
Durham	71	32		
Yorkshire, North Riding	90	67	1,358,442	1,374,582
Ditto, West Riding	48	29	219,547	229,027
Derbyshire	55	38	306,141	328,203
Lancashire	50	30	616,255	624,189
Cumberland	53	27	542,904	538,156
Shropshire	28	11	80,965	102,180
North Staffordshire	35	24	231,534	255,383
South ditto	147	55	392,949	428,276
Northamptonshire	20	15	138,370	106,948
Lincolnshire	21	11	125,043	116,257
Gloucestershire	9	2	42,351	25,602
Wiltshire	7	2		
Hampshire	1	0		25,150
Somersetshire	1	0		
Total	640	344	4,714,824	4,888,991
NORTH WALES.				
Denbighshire	9	3	23,091	26,715
Flintshire	2	0		
SOUTH WALES.				
Anthracite furnaces	13	4	367,392	342,478
Bituminous coal districts. Glamorgan	75	24		
Bituminous coal districts. Monmouth	57	29	373,744	368,480
Total of Wales	156	60	764,227	737,673
SCOTLAND	152	94	902,000	982,000

Of the production of pig-iron in Scotland in 1878 the Ayrshire furnaces, of which there are 40 built, and 24 of which were in blast, yielded 256,377 tons of pig-iron against 306,285 tons in the previous year. The Lanarkshire furnaces, 66 of which were in blast of the 92 built, yielded 604,280 tons against 620,474 tons in 1877. The works in Linlithgowshire and Stirlingshire, at Almond and Carron, yielding 41,343 tons in 1878 against 55,241 tons in the previous year,

For the purpose of comparison, both as to production of pig-iron and of coal used in manufacture, the respective quantities under each head are arranged as follows, showing the totals for each of the years 1878 and 1877:—

	1878. Pig-iron—tons.	Coal—tons.	1877. Pig iron—tons.	Coal—tons.
England	4,714,824	10,184,396	4,888,991	11,038,141
Wales	764,227	1,683,096	737,673	1,631,666
Scotland	902,000	2,244,813	982,000	2,672,638
Total	6,381,051	14,112,305	6,608,664	15,342,445

An examination of these figures clearly indicates the increased economy in the consumption of coal in this branch of iron manufacture, but a few years since—in 1869—it was ascertained that each ton of pig-iron made involved the consumption of 60 cwts. of coal; the returns of recent years exhibit a marked economy, thus in 1872 the amount did not exceed 57 cwts., and gradually each year since the quantity employed has shown a decrease, till in 1877 the average did not exceed 46 cwts., while in the past year it was—omitting fractional parts—about 45 cwts. of fuel to each ton of pig-iron smelted. In a few districts, however, where cold-blast iron is made, an average of 60 cwts. and upwards is still required, while in other districts less than 2 tons are sufficient. Again, in Scotland where raw coal is largely employed, 50 cwts. are not now exceeded, while five or six years since the average was 55 cwts.

The falling off in pig-iron production in 1878, as shown in the preceding statement, amounts to 227,613 tons. Referring to the market prices of the several varieties of pig-iron the quotations show a decline from January to December: Cleveland pig fell from 2*l.* 4s. 6d. in the beginning of 1878 to 1*l.* 18s. 9d. in December; West Cumberland Bessemer pig from 3*l.* 7s. 6d. to 2*l.* 15s.; while South Staffordshire pig 3*l.* 18s. 9d., and South Wales pig 2*l.* 17s. 6d., maintained a steady quotation during the year; again, Scotch pig-iron fell from 51s. in January to 43s. 3*l.* in December—the average price per ton in 1878 not exceeding 2*l.* 8s. 6d., compared with 2*l.* 14s. 4d. in 1877, and 2*l.* 18s. 6d. in the year 1876.

The average price per ton of the several varieties of pig-iron appear in the annexed schedules for 1878 and the previous year:—

Description of pig-iron.	1878.	1877.
Cleveland	£2 2 3	£2 3 6
West Cumberland	3 0 0	3 12 6
South Staffordshire	3 18 9	3 18 9
South Wales	2 18 6	3 12 6
Scotland	2 8 6	2 14 4

To render as complete as possible the distribution of the various forms of iron during 1878 and the previous year, the following returns of the Board of Trade showing the exports affords reliable information:—

Description of iron.	Quantities. 1878—tons.	Quantities. 1877—tons.
IRON—Pig and puddle	924,646	882,059
Bar angle	222,787	247,990
Railroad	441,384	498,256
Wire, not telegraph	43,709	51,092
Tin plates	155,071	153,226
Hoops, sheets, and boiler plates	192,362	200,117
Cast and wrought of all sorts	250,347	254,608
Old, for remanufacture	33,217	23,409
STEEL—Unwrought	24,120	24,292
Steel and iron combined	11,580	11,321
Total	2,299,223	2,346,370

MILLS AND FORGES.—These adjuncts of the iron trade have passed through a year of great depression, many for want of orders having wholly suspended operations, while others have been but partially active. In 1878 but 232 works were in operation either wholly or partially. These works had in operation 5125 puddling furnaces and 830 rolling mills, compared with 300 works, 6796 puddling furnaces, and 935 rolling mills in the previous year.

The works are thus located in the United Kingdom:—

County.	No. of works.	No. of puddling furnaces.	No. of rolling mills.
ENGLAND.			
Northumberland and Durham	14	776	64
Yorkshire (Cleveland)	9	258	19
Ditto (Leeds and Bradford)	11	210	49
Ditto (Sheffield and Rotherham)	14	297	83
Derbyshire	5	94	14
Lancashire	19	285	68
Cumberland	4	37	10
Shropshire	7	139	18
North Staffordshire	7	385	38
South ditto	105	1684	303
Gloucestershire	2	3	1
Somersetshire	1	10	3
NORTH WALES	1	30	4
SOUTH WALES.			
Glamorganshire	9	247	64
Monmouthshire	9	352	42
SCOTLAND	15	318	50
Total	232	5125	830

It is only necessary further to add that when a puddling furnace is fully employed the average consumption of coal varies from 1200 to 1300 tons per annum.

BESSEMER AND SIEMENS' &C., STEELWORKS.—An addition has been made to the number of these works during 1878 by the Blaenavon Iron and Steel Company have two converters, each of a capacity of 8 tons; another firm, Messrs. Brown, Bayley, and Dixon, Sheffield, have extended their means of producing steel by the Bessemer process by two convertors of 4 tons capacity. Mr. J. S. Jeans, in his report to the British Iron Trade Association, gives some idea of the capital employed in this special branch of manufacture. He says, "It has been calculated by a gentleman whose ample experience gives weight to his estimate, that each Bessemer converter in this country with all its accessory appliances represents, on an average, 20,000*l.* On this basis, therefore, there is at the present moment a total invested capital of 880,000*l.* totally unproductive in the Bessemer steel trade of Great Britain," represented by 44 out of 107 converters of various capacity, which were idle during the year 1878, while of the 63 converters in operation several were only active a part of the year. From the report above referred to some interesting facts are stated; the total production of Bessemer steel ingots during 1878 was 807,527 tons, being in round figures 60,000 tons more than the production of 1877. From these 807,527 tons of ingots 633,733 tons of rails were obtained, being nearly 100,000 tons more than the production of 1877. Relatively to the plant employed one establishment with four converters turned out 88,000 tons of ingots and 55,000 tons of rails, while another, as appears in the same report, followed closely, yielding 85,306 tons of ingots with the same number of converters.

The most remarkable feature of the steel trade is the unprecedented prices now ruling, compared with former years. Steel rails during the half-year ending December, 1878, were sold at 5*l.* 7s. 6d. per ton, compared with 6*l.* 7s. 6d. per ten the corresponding period of 1877, while in the same period in 1872 the prices were 15*l.* 10s. per ton.

Turning to the Board of Trade Returns for the past year it appears that the total export of steel rails amounted to 249,882 tons, compared with 235,453 tons in 1877, and 173,754 tons in 1876; the respective values being set down as 1,856,450*l.* in 1878, 1,936,391*l.* in 1877, and 1,636,852*l.* in the year 1876. The total increase of exports of steel rails in 1878 over 1877 was 14,429 tons, while in 1877 the excess of exports compared with the previous year was 61,699 tons.

TIN-PLATE MANUFACTURE.—The production of tin plate in 1878 shows an increase over the previous year of 8250 boxes; prices, however, as for some years past, have not been remunerative. The total production of tin plate was 4,058,000 boxes, compared with 4,049,750 boxes in 1877. Of these quantities actual returns were received for 2,257,791 boxes of tin, terne, and black plates in 1878 compared with 1,788,549 boxes in 1877, while the estimated quantities made by those works not giving returns amounted in 1878 to 1,800,209 boxes, compared with 2,261,201 boxes in 1877. These estimates were made by gentlemen intimately acquainted with the tin-plate trade, and may be regarded as strictly reliable. From the Board of Trade Returns the distribution of the great bulk of this manufacture is thus accounted for in the exports from the United Kingdom in 1878. The returns for 1877 are given for comparison:—

Countries receiving exports.	1877.	1878.
France ..... Tons	5,222	5,383
United States	106,593	108,124
British North America	9,060	5,447
Australia	4,353	3,697
Other countries	27,998	32,420
Total	153,226	155,071

From these exports it will be seen that the great bulk of the tin-plate exports were received by the United States, amounting to more than two-thirds, the Dominion of Canada, France, and Australia following next in order.

Considerable fluctuations appear in the value, thus in 1877, when the exports were 1845 tons less than in 1878, the value was 305,362*l.* in excess, the value of these exports in 1878 being 2,727,754*l.*, compared with 3,033,126*l.* in 1877.

In reference to tin-plate manufacture it is shown in the returns for 1878 that there are 75 works engaged in this branch of the iron trade, 43 of which with 168 mills are situated in Glamorganshire and Carmarthenshire, 10 works with 28 mills in Staffordshire and Worcestershire, 19 works with 59 mills in Monmouthshire and Gloucestershire, and 3 works with 9 mills located near Glasgow, Workington, and Mold.

The production and distribution of coal in 1878 will form the subject of the concluding notice of the Mineral Statistics of the United Kingdom in our next issue.

FURNACES FOR MELTING METALS.—Some important improvements in melting furnaces have been invented by Mr. CHARLES CARR, of Smethwick, who proposes to make the outer casing of the furnace of plates of iron, rivetted or bolted together. The lower part of the said iron casing constitutes the ash pit of the furnace, and the combustion chamber of the furnace is contained in the upper part of the said casing. The combustion chamber is made of fire brick, and is either circular or rectangular in plan internally, its exterior being by preference rectangular. The combustion chamber does not fill the part of the casing in which it is situated, there being a space all round the said combustion chamber and between it and the casing, which space in the upper part of the furnace is filled with sand or other bad conductor of heat. The upper part of the combustion chamber is fixed, being built upon iron shelves passing round the interior of the casing, the said shelves being made of cast-iron and bolted to the casing. The lower part of the combustion chamber is built upon shelves running round the inside of the casing, the front and back shelves being fixed, and the side shelves being loose and resting upon the fixed front and back shelves. The fire bars are supported on bearers carried by brackets at front and back of the ashpit. The fire bars may be drawn out in the ordinary way, or when necessary may be let fall altogether by unbolting the front brackets carrying their bearers. The lower part of the combustion chamber, which requires more frequent renewing than the upper part, can be removed and rebuilt without disturbing the upper part by removing the iron shelves on which it is supported. The space between the outside of the lower part of the combustion chamber is not filled with sand or other bad conductor of heat, as the like space in the upper part of the furnace is, but is left open and constitutes a channel all round the lower part of the combustion chamber for supplying air to the furnace. By inserting small distance pieces between the bricks of the lowest two or three courses instead of fire clay, spaces between the said courses are left through which the air enters the sides of the combustion chamber at the lower part, and together with air entering between the fire bars effects a vigorous combustion of the fuel in the furnace. Sliding dampers working in the sides of the lower part of the combustion chamber are employed to determine the amount of air entering the furnace, and thereby to regulate the combustion in and heat of the furnace. The fuel and melting pot are introduced at the top of the furnace, and the heated air and products of combustion pass by an opening at the top and back of the furnace into a chimney stack.

THE COAL TRADE.

Mr. J. R. Scott, the Registrar of the London Coal Market, has published the following statistics of imports and exports of coals into and from the port and district of London by sea, railway, and canal during August, 1879:—

IMPORTS.

By sea.	Ships.	Tons.
Newcastle	141	122,262
Seaham	48	24,306
Sunderland	87	60,445
Middlesborough	8	1,857
Hartlepool	82	29,526
Scotch	10	5,392
Welsh	17	7,016
Yorkshire	26	2,308
Small coal	8	4,348
Cinders	4	289
Total	431	257,749
Imports—Aug., 1878	379	235,047

By Railway and Canal.	Tons	c.
London & North-Western	107,823	6
Great Northern	73,030	0
Great Western	87,157	0
Midland	148,763	0
Great Eastern	48,127	5
South-Western	4,018	8
South-Eastern	1,390	17
Grand Junction Canal	244	10
Total	470,554	6
Imports during Aug., 1878	453,165	13

Comparative Statement, 1878 and 1879.

By Sea.	Ships.	Tons.
Jan. 1 to Aug. 31, 1879	3269	2,138,112
Jan. 1 to Aug. 31, 1878	3211	1,963,229
Increase—1879	58	174,883

By Railway and Canal.	Tons.	c.
Jan. 1 to Aug. 31, 1879	4,220,061	12
Jan. 1 to Aug. 31, 1878	3,544,129	15
Increase—1879	675,931	17

EXPORTS.

Railway-borne coal passing *in transitu* through district ..... Tons	76,654	
Sea-borne coal exported to British possessions or to foreign parts, or to the coast ..... Tons	40,980	
Ditto, sent beyond limits by railway	19,259	
Ditto, by canal and inland navigation	1,703 =	61,942
Railway-borne coal exported to British possessions, or to foreign parts, or the coast	31,238	
Ditto, by canal and inland navigation	74 =	31,312
Sea-borne coal brought into port and exported in same ships		856
Total quantity of coal conveyed beyond limits of coal duty district during August, 1879		170,764
Ditto, August, 1878		146,994

Comparative Statement, 1878 and 1879.

Total distribution of coal from Jan. 1 to Aug. 31, 1879	1,492,803
Ditto, Jan. 1 to Aug. 31, 1878	1,354,229
Increase in the present year	138,574

General Statement, 1878-1879.

Increase in coals imported by railway	675,931	
Increase in coals imported by sea	174,883 =	850,814
Less increase in coals exported		138,574
Total increase in trade within the London district		712,240

THE COPPER TRADE.

Stocks in Europe:—	Tons.	
Chiliores and regulus, Liverpool & Swansea (equal to fine)	3,753	
Chili bars in Liverpool	25,594	
Ditto Swansea	2,606	
Foreign copper (chiefly Australian) in London	5,256	
Ditto ditto landing	541	
English copper in London	50	
Chili bars and ingots and Barilla in Havre	4,645	
Other copper in Havre	800 =	43,245
Afloat and chartered from Chili to Europe (advised by mail):—		
Ores and regulus (equal to fine)	2,363	
Bars and ingots	6,751 =	9,114
Afloat from Australia (advised by mail):—		
Fine copper		1,199
Afloat and chartered from Chili to Europe (advised by cable):—		
Fine copper (advised by cable 6000 t., less already arrived 400 t.)		5,600
Total ..... Tons		59,149

Leadenhall-street, Sept. 1. HENRY R. MERTON AND CO.

Chili copper charters for the first half of this month were 3200 tons, consisting of 2250 tons bars and 900 tons furnace stuff for England, and 50 tons bars for the Continent. A considerable business has been done in Chili bars during the past fortnight at prices ranging from 53*l.* 15s. to 55*l.* per ton according to brand. The market to-day closing sellers at our quotations. In furnace material the transactions comprise 363 tons Bolivian ore at 10s. 9d. per unit, 545 tons Bolivian regulus at 11s., 160 tons Peruvian ore at 11s., 769 tons Spanish precipitate at 11s. to 11s. 3d., and 160 tons English precipitate at 11s. to 11s. 1½d. per unit. Imports of Chili copper during the past fortnight, 2617 tons fine; delivery, 2035 tons fine. Arrivals here during the fortnight of West Coast, S.A., produce:—Compadre, from San Antonio, 80 tons bars; Philip Nelson, from Valparaiso, 50 tons bars; Limari, from Chili, &c., 177 tons bars; Malacci, from Valparaiso, 313 tons bars; Valparaiso, from Valparaiso, &c., 400 tons bars, 55 tons ingots; Caroline, from Chanaral, 840 tons bars; Theta, from Totoralillo, 300 tons bars Zeta, from Guayacan, 100 tons bars. At Swansea—Mary Jose, from Tocopilla, 345 tons ores, 517 tons regulus. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

	Ores.	Regulus.	Bars.	Ingots.	Barilla.
Liverpool	—	1433	25,594	—	—
Swansea	906	6505	2,606	—	—
Total	906	7938	28,200	—	—

Representing about 31,953 tons fine copper, against 31,371 tons Aug. 15; 22,989 tons Aug, 51, 1878; 18,282 tons Aug. 31, 1877; 13,863 tons Aug. 31, 1876. Stock of copper contained in other foreign ore and Spanish precipitate, 2000 tons fine. Stock of Chili copper in Havre, 4350 tons fine, against 7607 tons Aug. 30, 1878; stock of Coro Coro barilla in Havre, 350 tons fine, against 2075 tons Aug. 30, 1878; stock of Chili copper afloat and chartered for to date, 15,000 tons fine, against 9000 tons Aug. 30, 1878; stock of foreign copper in London, chiefly Australian, 5500 tons fine, against 6000 tons Aug. 30, 1878.

Liverpool, Aug. 30. HARRINGTON, HORAN, AND CO.

We have now, within a slight fraction, 60,000 tons of copper in stock and afloat, including shipments advised by cable (which we omit from our figures, being somewhat vague at times), but in spite of this erroneous stock, buyers have been found to purchase both spot and forward bars all the month at gradually higher values, the market now being fully 30s. dearer than at the beginning of August. Consumers, both here and on the Continent, have not shown much disposition to operate at present, so that investors have had the market very much to themselves, but the price has gradually advanced. Many believe the imports will now steadily decrease, and when the trade begins to purchase, prices will run up far higher than now. The demand for India is much checked, owing as well to advance in prices here as to exchange falling the other side. Quotations must rise considerably before an increased Indian demand can be safely counted upon. There have been fair orders for manufactured from Russia and other parts, which have made the smelters lately somewhat independent of the Indian trade.

We subjoin our usual monthly statistics:—The imports of copper into England for the first seven months of the following years: 1875, 48,510 tons; 1876, 45,918; 1877, 54,026; 1878, 51,428; and 1879, 56,157 tons. The exports for the same periods were: 1875, 27,542 tons; 1876, 28,668; 1877, 29,250; 1878, 33,338; and 1879, 35,316 tons. The position from Sept. 1, 1878, to Sept. 1, 1879, was as follows:—

	Price.	Stock on hand.	Stock, including afloat and chartered. Advised by mail only.
1878—September 1	£ 60 15 0	Tons 38,676	Tons 44,985
October 1	60 0 0	39,097	44,757
November 1	57 0 0	39,712	47,567
December 1	59 0 0	39,008	47,073
1879—January 1	58 0 0	37,890	48,474
February 1	56 0 0	39,538	47,153
March 1	55 0 0	39,452	48,266
April 1	56 0 0	39,752	49,051
May 1	56 0 0	41,624	48,965
June 1	55 0 0	41,269	48,432
July 1	56 0 0	41,877	50,447
August 1	53 10 0	42,395	51,011
September 1	54 10 0	43,229	52,479

And the comparative positions at the same date of the past four years with the present:—

	Price.	Stock.	Stock, including afloat and chartered. Advised by mail only.
1875—September 1	£ 83 0 0	Tons 23,022	Tons 32,342
1876—September 1	72 0 0	24,417	30,548
1877—September 1	67 0 0	31,004	35,437
1878—September 1	60 15 0	38,676	44,985
1879—September 1	54 10 0	43,229	52,479

The charters to Aug. 30, 1879, were 34,700 tons, against 32,150 tons in 1878.

Leadenhall-street, Sept. 4. HENRY ROGERS, SONS, AND CO.

Messrs. Richardson and Co. (Sept. 1) write that the stocks of Chili copper produce remaining unsold at Swansea on Aug 1 were—Ore, 906 tons; regulus, 6505 tons; and copper, 3101 tons. The arrivals since have been 345 tons of ore and 517 tons regulus, both of which were sold privately; 495 tons of copper has also been sold privately. The present stocks are—Chili, 906 tons; Cape, 1514 tons; Newfoundland—Betts Cove, 4709 tons (and 13 tons regulus); Union, 239 tons; New Quebrada, 381 tons; Portuguese precipitate and ore, 344 tons: Algerian, 59 tons; British, 672 tons—total ore unsold at Swansea, 8824 tons; regulus, 6517 tons; copper, 2606 tons. These totals represent about 7800 tons fine copper. There has been no public sale of Cape produce since July 30. The one cargo of Chile furnace material arrived fetched 10s. 9d. and 11s. per unit. Two parcels of New Quebrada ore, 190 tons and 480 tons, have realised 10s. 7¼d. About 1700 tons of Spanish precipitate have been sold during the month at from 10s. 9d. to 11s. 3d. The Chile charters for the first fortuight of the past month are heavy, being 3200 tons of metal, 2250 tons in ingots and 900 tons in ores and regulus for England, and 500 tons bars for France. There has been a good demand for Chile bars, and the rise that took place in the early parts of the month has been fairly maintained.

The announcement of heavy charters advised for first half of August was a disappointment to holders, but nothing being pressed for sale, values remain steady, Chili bars ranging between 53*l.* 15s. to 55*l.* At the close there is a tendency to higher rates, rather, it would seem, in sympathy with other metals than from any improvement in position as regards supply and demand. Australian was neglected, but prices upheld. For English manufactured there is an improved shipping demand. Charters for the first half of August were advised 3200 tons; charters for the second half of August were advised 900 tons. We quote Chili bars, 55*l.*; Wallaroo, 62*l.* 10s.; Burra, 62*l.*; tough, 59*l.*; manufactured, 65*l.* to 66*l.*; ore and regulus, 10s. 6d. to 11s. per unit.

The imports and exports for the seven months, January to July were, by the Board of Trade Returns—

IMPORTS.	1879.	1878.	1877.
Ore ..... Tons	59,982	57,416	57,478
Regulus	27,070	20,096	20,759
Copper	27,582	23,882	24,059
EXPORTS.			
Foreign raw	9,582	6,989	8,597
English raw	9,275	11,966	6,060
Manufactured, including yellow metal and brass	18,918	15,512	16,698

London, Sept. 4. FRENCH AND SMITH.

THE TIN TRADE.

Our Tin Market was very quiet at the beginning of the month, prices giving way about ⅛ fl. With an excellent trade demand and some speculative buying, a decidedly better feeling has since manifested itself, and we have to report a recovery in value of fully 3 fl. from the lowest point. This advance has been chiefly brought about by increased buying on the part of the trade, which we consider a highly satisfactory feature. The metal markets generally display more activity than has been the case for a long time, and a further improvement during autumn is confidently looked for. Banca after receding from 28¾ fl. to 38¼ fl., came into active demand, and with a considerable business, the price has since advanced to 41¼ fl. Contracts for delivery ex September sale changed hands from 38½ fl. to 41½ fl. Billiton has been in good request during this month, the price advancing from 37¾ fl. to 41 fl. Parcels for forward delivery have been dealt in rather freely at about the same rates: 13,000 peculs Billiton offered in public sale at Batavia, on the 11th inst., fetched the average price of 43,26 costing to sell here about 38 fl. by steamer. Next sale comprising the same quantity will be held on Oct. 13 The position of Banca tin in Holland on Aug. 30, according to the official returns of the Dutch Trading Company, was:—

	1879.	1878.	1877.
Import in August ..... Slabs	10,807	20,035	1,052
Total eight months	99,985	99,609	115,249
Deliveries in August	16,274	10,813	18,141
Total eight months	93,625	78,288	93,870
Stock second hand	45,922	38,000	29,290
Unsold stock	32,836	48,885	46,260
Total stock	78,758	86,885	75,550
Afloat ..... Peculs	7,800	1,200	1,100
Statement of Billiton:—			
Import in August ..... Slabs	24,300	10,689	6,200
Total eight months	88,336	76,764	77,744
Deliveries in August	10,616	9,730	8,417
Total eight months	69,223	61,048	59,192
Stock	72,725	54,226	49,171
Afloat ..... Peculs	18,000	17,000	14,000
Quotation { Banca	41½ fl.	38 fl.	40½ fl.
Aug. 30. { Billiton	41	36	38½

These combined returns of Banca and Billiton for 1879, compared with those for 1878, exhibit—An increase of the import for August of 137 tons; an increase of the import for the eight months of 373 tons; an increase of the deliveries for August of 198 tons; an increase of the deliveries for the eight months of 735 tons; an increase of the stock second hand of 823 tons; a decrease of the unsold stock of 502 tons; an increase of the total stock of 324 tons; an advance in the quotation of Banca of 5*l.* 15s. per ton. The Government Returns for June are—

EXPORT OF TIN FROM HOLLAND.

	June.			Six months.		
	1879.	1878.	1877.	1879.	1878.	1877.
Germany ..... Tons	198	915	312	1339	1716	1565
England	1	14	5	371	73	179
Belgium	—	117	143	633	769	924
France	43	87	41	190	232	351
Hamburg	31	47	32	159	345	191
United States	125	—	—	309	10	55
Other countries	60	20	127	75	232	260
Total	458	480	660	3076	3377	3525

Rotterdam, Aug. 30. EBELING AND HAVELAAR.

	July 31, 1879.	Aug. 30, 1879.	Aug. 31, 1878.	Aug. 31, 1877.
Straits and Australian, spot ... Tons	10,045	9,521	9,659	8,781
Ditto, landing	384	203	451	1,309
Straits afloat	240	230	120	—
Australian, afloat	1,061	1,286	2,341	1,788
Banca, on warrants	1,944	1,435	1,186	915
Billiton, spot	1,845	2,273	1,718	1,502
Ditto, afloat	1,100	800	1,200	1,000
Australian tin in Holland	220	210	426	700
Total ..... Tons	16,839	15,958	17,101	15,995
Deliveries during the month in London	1,113	1,059	1,033	793
Ditto, Holland	665	836	575	801
Total ..... Tons	1,778	1,895	1,608	1,594
Shipments during the month from Straits ..... Tons	160	150	120	—
Ditto, Australia	575	400	1,100	550

	During first 8 months.	During first 8 months.	During first 8 months.
Shipments from Straits to London ... Tons	2,705	2,430	2,436
Shipments from Australia to London	4,481	6,375	5,925
Deliveries of tin in London	8,661	7,959	6,852
Deliveries of tin in London and Holland	14,127	12,231	11,568

Banca in Trading Company's hands and afloat, 1514 tons.

London, Aug 30. A. STRAUSS AND CO.

Continued large deliveries and moderate shipments enable us this month to show a statistical position highly favourable to holders, and under this influence prices have rapidly advanced from 71*l.* for foreign, and to 73*l.* for English ingots. Improved trade in America enables buyers there to outbid us in the east, therefore we may look for a decreasing London stock for some months to come. The falling off in Australian shipments is now very marked, showing that the large profits to be made in smelting tin there are delusive at present values: 13,000 piculs Billiton offered in public sale at Batavia on the 11th ult. realised an average price of about 38 fls. in Holland. We quote—foreign, 71*l.*; English ingots, 73*l.*; Banca and Billiton, 42 fls.

Below we give our usual statistics:—	1879. Aug. 1.	1879. Sept. 1.	1878. Sept 1.	1877. Sept. 1.
Foreign in London ..... Tons	10,419	9,724	10,111	10,074
Banca in Holland	1,944	1,435	1,188	915
Billiton in Holland	1,845	2,273	1,695	1,500
Afloat for Europe, Straits, advised by mail and wire	240	220	120	—
Afloat, Australian ditto	1,060	1,300	2,150	1,850
Afloat, Billiton	1,125	800	1,000	800
Banca in Dutch Trading Co.'s hands	688	1,026	1,528	1,445
Banca afloat, by sailing vessels	450	488	80	70
Total	17,771	17,266	17,872	16,654

Sept. 4. FRENCH AND SMITH.

COAL.—For the first seven months of the year the increase in the exports of coal amounted to 105,749 tons, while the declared value was 11·8 per cent. lower as compared with 1878, the respective average values being 8s. 6d. and 9s. 5d. per ton.

TWO NEW METALS.—The discovery of two new metals is announced, named Samarium and Norwegium. Paradoxical as it may sound to speak of the finding and christening of a hitherto unknown metal before it has been either seen or handled, yet such is the case with Samarium. As happened in the instance of the metal Gallium, it has first become known to science by means of the spectrum analysis alone; nor can it be doubted that in the verification of its existence by the senses it will in due time follow the same precedent. It is well known that by means of the characteristic rays which are seen in the luminous spectrum produced by the combustion of any substance it is possible to single out the known or unknown bodies which enter into the combination. As are the rays, such are the elements producing them. When rays are found answering to no substance already catalogued, the existence of some new body is naturally inferred from the fact. That was how Gallium was first brought to light, and now we have a like history for Samarium, M. Lecoq de Boisbaudran, who has greatly distinguished himself by his researches in this branch of science, found, as he was examining a mineral known under the name of Samarkite, an emission of unfamiliar rays. He has inferred thence the existence of this mineral of a new metal which he has accordingly named Samarium, and all he has now to do is to isolate it from the other elements with which it is as yet combined, This has already been done for the other new metal, Norwegium, patriotically so named after his fatherland by its discoverer, Prof. Tellef-Dahll, of the University of Norway, who detected it in a metallic compound of arsenic and nickel. The professor has even determined the principal properties of his new metal, which he describes as being white, slightly malleable, of about the

hardness of copper, and fusible at a dull red heat. Its density is represented by 9·44, and its chemical equivalent is 145.

THEORY OF FLUID MOTION.—The difficult work successfully accomplished by engineers, and the marvellous progress made by inventors during the past half-century, may be almost entirely traced to the greater attention paid to secure accuracy and to exercise judgment in the application of natural laws. The man who now depends upon chance experiments for giving him desired results is soon left far behind by him who avails himself of the knowledge which has been obtained by systematic scientific investigation, and as it is not to be expected that the proceedings of the various learned societies, nor even the various technical periodicals, can be regularly consulted such treatises as those contained in Van Nostrand's Science Series are invaluable. The last issued volume —No. 43—is in no respect inferior to any of its predecessors, whilst it deals with a subject which will be of great utility to a large number of practical men, and contains the elements of the mathematical theory of fluid motion in a form which will enable those who study the memoir to grasp the principal facts easily and thoroughly. That problems in hydrodynamics are frequently very difficult cannot be doubted, and this difficulty is not diminished by the fact that no general work upon the subject exists, so that the student has to pick up his information as best he can. This obstacle to progress Dr. Craig proposes to remove by treating the entire subject systematically and exhaustively, and the present Science Series volume (Elements of the Mathematical Theory of Fluid Motion—Wave and Vortex Motion. By Thomas Craig, Ph.D., Fellow in Physics in the Johns Hopkins University, Baltimore. New York: Van Nostrand. London: Trübner and Co.) furnishes an outline of and introduction to the complete treatise which he intends shortly to publish. Dr. Craig has taken especial care that the student shall be led on by easy steps to the thorough comprehension of the subject. Commencing with the consideration of the general equations of fluid motion, he demonstrates that the circulation in any closed line moving with the fluid remains constant. He then explains such leading principles of the theory of the potential as frequently recur, and explains the derivation of them; examines the motion of water in plane waves when the excursions of each particle are very small, discusses the generation of cylindrical waves, and then considers free vortex motion generally. The style of treatment is clear and explicit, and will be thoroughly intelligible to anyone who has made but limited progress in mathematical study. Dr. Craig's complete treatise will be looked forward to with much interest.

CASSELL'S PUBLICATIONS.—The current number of Knight's Practical Dictionary of Mechanics extends from Grit to Handmill, and contains interesting notices of the guillotine, which it is mentioned was, although named after Dr. Guillotin, who lived from 1738 to 1814, in use in Naples in 1268; of guncotton; and of gunpowder. The third part of the History of Protestantism extends from the time of the arrival of Gregory XI. bulls against Wycliffe to Huss's withdrawal from Prague. Such heretical views as those of Wycliffe that "prelates are more bound to preach truly the gospel than their subjects are to pay them dymes, for God chargeth that more, and it is more profitable to both parties" were equally unacceptable to pope and prelates, but the people and the University of Oxford preferring the truths laid bare by Wycliffe to the bulls and errors of the papal see the former prevailed. The chapters deal with the hierarchical persecution of Wycliffe; his views on church property and church reform, some of which still remain to be carried out; his exposure of the dogma of transubstantion, invented for the Papists by Paschasius Radbertus in the ninth century, and brought to England by the Normans; his appeal to Parliament, his appearance before the Convocation at Oxford, and his theological and church system. The third book records the life of John Huss and the Hussite wars, and gives an interesting account of the rival popes; the part ending with the preparation for the Council of Constance. The Great Industries of Great Britain—part 20—closes the second, and contains the title and index thereto. The articles contained are continuations of those on the Royal Arsenal, Woolwich, cotton, pottery and porcelain, hemp, flax, and jute, shipbuilding, iron and steel, and wool and worsted. Science for All—part 22—continues protective mimecry in insects and in animals, and contains interesting articles on the physics of music, by Prof. Lowe; on touch, by Mr. F. J. Bell; on animal colonies, by Dr. Wilson; and on colour blindness, by Mr. G. Allen.

"RENTS AND PURCHASES."—A concise and practically useful little volume on the valuation of landed property, woods, minerals, buildings, &c., by Mr. JOHN SCOTT, the author of "The Farm Valuer," has just been issued by Messrs. Longmans, Green, and Co. By the attentive study of the work, which only occupies 127 pages (including appendix, 13 sets of tables, and an excellent index), the reader will have no difficulty in calculating almost instantaneously the methed of valuation of estates of all kinds, and of ascertaining the relative values of freehold, copyhold, and leasehold tenures, as well as the worth of reversions, and other particulars of a similar kind. Farms, deer forests, and grouse moors, minerals, woods, buildings, ground rents, and property taken for railways and other public works are treated of separately, and in connection with the valuation of minerals. Mr. Scott's observations are at once clear and intelligible to the least legal-minded reader. He remarks that the greater part of our country's wealth and population is seen to follow and centre in the most productive mineral districts. Minerals may, he says, be divided into several classes, each of which requires to be treated differently, and the estimation of which requires a perfect knowledge of the particular locality, of the strata, dip, &c., as well as of former workings of the same kind in the same formation. The mineral value of an estate may arise from superficial clays, sands, gravels, peat, marls, or coprolite deposits, or from sandstones, limestones, coal, ironstones, granites, and greenstones, or from the occurrence of metalliferous veins. He considers that the purchase value of mineral property may be taken at 12 to 16 years purchase, or half the value of agricultural land, but it must be taken into account that unlike the rental of land the revenue that is derived from mines is liable to the greatest fluctuation, and even to be terminated altogether in an abrupt manner. The chief consideration is the continuance of the present reputed rental value of the minerals, and if this can be correctly fixed it affords the true data for estimating the purchase value, and any proposed extension of the workings should be dealt with as an improvement of the property. The volume is one which should be thoroughly and thoughtfully studied by miners and mine adventurers, as it will prevent the former from making demands beyond what the real value of the property justifies, and enable the latter to appreciate properties offered for development at fair prices.

FRENCH-GERMAN TECHNICAL VOCABULARY.—Although there are now a large number of fairly accurate technical dictionaries, they usually possess special characteristics which somewhat lessen their utility—the information is so given that they are of little value to those who require to consult them, and intelligible only to those who can dispense with them. The amusing results produced by Englishmen relying upon this class of aid was frequently noticeable at the Paris Exhibition, one exhibitor explaining in the language which he vainly supposed to be French, how his pump was to be placed in the "tige" (a word which, it is true, means "shaft," but has no connection with anything in which a pump would be placed), and even the president of the Iron and Steel Institute, laying prominently before his French hosts his "address" (= impudence, and not a spoken address, which is "discours"), these being errors which, with the ordinary technical dictionaries, can only be avoided after long practical experience. Appreciating these difficulties, Dr. F. J. Wershoven, of Brieg, has prepared a "Vocabulaire Tecnique Français-Allemand (Leipzig: F. A. Brockhaus) upon an entirely new and far more practical system, which will ensure a thoroughly intelligible translation even by those who have made comparatively little progress with the technical language of the other country. The technical terms used in connection with physics, machinery, chemistry, and industrial manufactures are each arranged in separate chapters, which again are sub-divided for easy reference, so that when one intends to read or write about pumps, for example, the index is consulted, and the list at once turned to in which all the technicalities connected with pumps are seen at a glance. The same can be done if the reader be interested in music, meteorology, electricity, steam-engines, locomotives, railways, metallurgy, brewing, paper making, and so on, and the result is equally satisfactory. The work has been wonderfully well received on the Continent, which, however, is not surprising when the great utility of the book is considered. Prof. Weiske, of Leipzig University, Prof. Eger, of the Darmstadt Polytechnic School, and others equally well known, have recommended it to their students, and so fully has the value of the system of arrangement been recognised for the preparation of the corresponding English-German Vocabulary, which will be published in a few months, that Dr. Wershoven has received valuable contributions from some of the most eminent engineers and scientists in Germany, including Profs. von Kaven and von Reiche, of Aix-la-Chapelle (the former having written a preface); Hartig, of Dresden; Sternberg, of Karlsruhe; and Freiherr von Weber, of Berlin. In the English-German volume the chapters on mining, metallurgy, railways, and machinery have been greatly enlarged, and some new chapters have been added, embracing branches of industry not previously included. Dr. Wershoven has evidently spared no pains to make his vocabulary perfect, and as he has in all cases transferred the words and phrases from the original technical treatise in which they appeared, and then given the corresponding German, accuracy is ensured. The amount of labour involved must have been enormous, but Dr. Wershoven may congratulate himself that the result has well repaid it, and will be appeciated by a very large number of readers.

Meetings of Public Companies.

THE IBSTOCK COLLIERY COMPANY (LIMITED), LEICESTERSHIRE.

A meeting of shareholders of this company was held on Thursday, Aug. 28, on their extensive premises at the colliery—Dr. SAMUEL THOMSON, Chairman of the company, presided. The object of the meeting was to consider the annual report of the company, and to elect directors in the place of those retiring. The report was so far of a satisfactory character. It was shown that whereas last year the loss was over 2000*l.*, this year, after all was paid, such as interest on the various matters, there was a profit of 1130*l.* It was agreed that no dividend be declared, but that the sum be applied to new works.——Mr. Bennett, merchant, Leicester, was appointed a director in the place of Mr. Standing, resigned.—Dr. Thomson, the Chairman, was also re-elected a director.——A vote of thanks to the Chairman concluded the business of the meeting.——The shareholders and friends afterwards dined together as usual.

WEST HOLWAY LEAD MINING COMPANY.

The statutory meeting of shareholders was held at the offices of the company, Great St. Helen's, on Tuesday,

Mr. E. J. BARTLETT in the chair.

The notice convening the meeting was read by the secretary.

The CHAIRMAN said:—Gentlemen, I regret we have not a larger attendance here to-day, but the proceedings of the meeting will be reported and sent to each shareholder, so perhaps a little explanation may be useful with respect to the operations carried on by this company, and I think you will agree with me when you have heard the few remarks which I have to make, that we stand in a very happy and comfortable position. Previous to the present company taking possession of this property, or rather, I may say, a portion of it, operations had been conducted for a considerable period, and very large expenditure incurred in opening up the mine, driving levels, sinking a shaft, and erecting simple plant; and as far as the original portion of the property is concerned there has been a considerable amount of lead extracted, but the levels are now ready for further development, and our manager, in whom we have the greatest confidence, anticipates that we shall have a very large yield from this portion of the property. Our present proceedings, however, relate more to the northernly end of the sett. Previous to the occupation by the West Holway Lead Company private capitalists undertook the driving of a very long level, in order to ascertain the value and richness of the celebrated Holway vein, which had proved so very productive both to the east and west. After careful dialling general estimates had been formed as to the position in which the lead would be found, but it was not contemplated by them that such a large amount of money would have to be expended before they reached the object of their driving. After driving a level something like 600 or 700 yards they thought it necessary to sink a sump 20 yards, from which they drove some distance north, and sunk a sump another 20 yards, making a distance altogether of 140 yards from surface, and before this present company took possession the east and west lode had been intersected, and a vein discovered of splendid character, averaging from 4 to 6 ft. wide, containing galena which would assay about 10 or 12 ozs. of silver per ton and about 86 per cent. for metal. It was not at all improbable when this lead was intersected that there might be an influx of water, but it was found after driving east and west, and extending a short distance upon the course of the lode, that the lode was perfectly dry—a very important point in the history of the property. (Hear, hear.) Well, the question may arise with some shareholders as to why we have not any returns of lead, and why, considering these discoveries were made before the present company took possession, we have not heard of monthly parcels of ore? Another point necessary to be cleared up also is this—Why did not the previous proprietors, after they had satisfied themselves of the value of the property, endeavour to keep possession of it, and not let the West Holway Lead Company derive the advantage? Well, as I have said, the previous proprietors had to expend a much larger amount of money here than they expected, and they found it would be necessary, having first proved the discovery, to incur certain expenditure for the sinking of a new shaft to draw up the stuff. They, therefore, proposed the formation of a company. Of course, we all know how companies are sometimes got up, large sums of money being paid for promotion, and the capital account burdened by expenditure, which tells heavily when profits have to be divided, but you will be very glad to hear that this company was formed as few others have been formed, the original promoters having consented to take shares of the company in full for the amount expended. There has been nothing added to that, and there has been no cash paid, so that the promoters stand holding a certain amount of shares in the present company, and they will derive the greater amount of benefit from the workings being conducted by an influential company like ourselves than they would if the whole expenditure had fallen upon their shoulders. (Hear, hear.) To draw the stuff to surface by bringing it up a sump 20 yards, carrying it along a level another 60 yards, then up another sump, and along the level up to the shaft, takes a great deal of the gilt off the gingerbread; therefore, the present company having satisfied themselves that they had a very valuable mine, decided to leave these discoveries, sink a shaft from the surface, and erect upon it sufficient power to draw up the mineral. With this object in view myself and the directors, who have taken great interest in the affair, thought it advisable, before the scheme was, so to speak, launched amongst our many friends, to secure an additional piece of ground on the line of the east and west lode. Well, we went to considerable trouble over this matter, but I am very pleased to tell you that we were successful beyond our most sanguine anticipations, and as there have been no operations below 40 or 50 yards from surface, you can easily imagine that our returns should be very extensive. It is not usual at a statutory meeting to go into such explanations with respect to these points, but I maintain that we, as directors, should not be too careful as to the amount of explanation we afford, even although only four months have elapsed, more especially when I tell you that it has not been found necessary to issue a prospectus, because from the confidence which our friends have had in us the whole of the capital for the development of the mine has been found, as I shall tell you presently, at a very small expenditure indeed. We have kept in view this shaft, and have already carried it down successfully to a depth of 40 yards, and as soon as the sinking is completed to 60 yards from surface we intend to put up a portable engine that we have secured to wind up the stuff. We anticipate the expenditure for this engine, as well as for fixing, at something like 150*l.*, and not having water to contend with there will be no provision necessary in the shaft to make room for the pumps, or any of the paraphernalia which is often necessary in mines larger and deeper than our own. During the four months the company has been started we have accomplished a good deal of work. There is another point which requires explanation. We have now sunk the shaft 40 yards. At 60 yards we should intersect a lode, but we do not think that we should stop there, but having ample funds in hand we ought to go on until we get to the 100. At the 60, however, we propose to throw out cross-cuts to the east and west lode, and there we know we have valuable lead to take away, so that any way we have only to wait till a depth of 20 yards more is accomplished to reach the object in view. The depth of 100 yards will put us, taking off the fall in the surface of the ground, on the line of the great discovery made before this company started. To go into a history of what the lode has done in times past would take up a great portion of your time. Suffice it to say that it has returned thousands upon thousands of pounds, and yielded fortunes to a great many people residing in the locality, and others connected with the working of the mine. I have told you that we have found the vein deeper than it has been intersected before, as the former proprietors were only able to go to a depth of 60 or 70 yards. In years gone by the vein only averaged a width of 4 feet, and yielded sometimes 2 or 3 tons per fathom, and sometimes more; and if there is anything which will make our success doubly sure it is the actual fact that in the vein which we have discovered we have a lode from 4 to 6 feet wide, containing more galena in the fathom of ground than at any time that the Holway vein has been worked throughout the country. (Cheers.) These points if they are taken into consideration will give you some idea of the valuable property with which we as a company have become connected. Without being too sanguine as to our future I am of opinion that during the early part of next year we should be able to place ourselves in the Dividend List. When you come to take into consideration the inexpensive means of haulage, the proximity of the shaft to the dressing-floor—about 50 yards—and also the fact that we should be raising lead at a time when the market has so much improved, I think you will bear me out in stating that the mine is likely to prove one of the best in the Principality. Now, gentlemen, in companies of this sort when discoveries are made, and shafts are driven, we generally hear that something further must be done, dressing-floors or something else made, which often tends very much to dishearten the shareholders. In our case we have nothing whatever to do. As chairman of the company I have taken care during the time the 40 yards sinking was proceeding that the small floors which we had should be improved, and the dressing shed placed in thorough order, so that when the depth I have mentioned is attained we shall have nothing to do but to drive our levels, and I think I may say that within a fortnight of the time of the shaft being down to the required depth we shall be raising and selling lead in fair quantities. I may mention that there is also ground to the south, where tributers can be placed, and considerable returns realised. There is also ground to the left upon our portion of the property, which can be turned to great advantage, so whether you take the terms upon which the property has been acquired, its present position, or its future prospects, I say we ought to be pleased we are associated with so genuine a concern. It is not customary at these statutory meetings to go into the question of accounts, but there I think my argument comes in that we should endeavour at our four-monthly meeting to say something as to what has been done with the money subscribed, and what funds we have in hand. We know that in balance-sheets there are generally two items which are very annoying, and figure very largely. I have been acquainted with companies for years, and in some I have seen the preliminary expenses figure at from 500*l.* up to 700*l.* and law costs commencing at 20*l.* and going up to 150*l.*, but I am delighted to say that in our case the preliminary expenses were 17*l.* 10*s.*, and our law costs were only 7*l.* 17*s.* 10*d.* I have already told you that we drove to a certain extent upon the course of the discovery which we had made, but it was only like extracting lead from a good sized nut, my object rather having been to prove its value, and the best way to work up the lead for the market. Well, we thought a matter of 50*l.* or 60*l.* would be sufficient, but I was not satisfied, and so our agent sent to market a parcel, which is credited at 112*l.* 16*s.*, and this has been done in four months. There is one thing which I have passed over. On the top of this deposit we met with beautiful specimens of copper. Now, if we go back and trace the history of lead veins in the county we find that where the richest body of ore has been discovered copper has been found at the top like a crust, but not in any quantity. I do not tell you this to convey any idea of value, but simply as an omen of great success. We have had some assays made, and I shall be happy to show any gentleman some of the nuggets we have received, not that we have any quantity, nor do we propose to sell any, but I merely mention it as a good indication. As I said before, we have issued no prospectus. The shares have been taken up by myself, my colleagues, and our friends, and the position I hope will please you. I may mention that after paying every liability whatsoever, and after receiving the calls due upon the shares which have been allotted, we shall have a splendid balance available of 3937*l.* 19*s.* 7*d.* With these remarks I need not detain you longer, but simply say that, as I prognosticated months ago, with a valuable improvement in the price of lead and blende, with a mine with facilities for immediate development such as few others possess, with discoveries made and proved, and with the economical management which we have brought to bear upon the concern, I think it will not only be a pleasure to meet you here from time to time, but we shall be able to congratulate you upon increasing dividends and an increase in the market value of the concern, which, as I said before, should prove second to none in Wales. (Cheers.)

On the motion of Mr. Broadway, the directors, Mr. E. J. Bartlett, Mr. Gamble, and Mr. East, were re-elected, and the meeting broke up.

PEN-YR-ORSEDD LEAD MINING COMPANY.

The statutory meeting of shareholders was held at the offices of the company, 30, Great St. Helen's, E.C., on Tuesday,

Mr. E. J. BARTLETT in the chair.

The SECRETARY read the notice calling the meeting.

The CHAIRMAN said: Gentlemen, as you are aware, this meeting is convened in accordance with the Companies Act, and, of course, there is not much information to be given to the shareholders beyond that contained in the prospectus which many of you have received. The company has been hitherto more of the nature of a private concern. At the time the present company took it over they were enabled to secure something like 200 acres of ground for a period of 21 years—of course, with the option of renewal—and what is a material feature in the whole affair, at a dead rental of only 40*l.* per annum, and instead of a royalty of 1*l.* per ton the leases have been obtained with a reduction of 5*s.* per ton. Some years ago valuable discoveries of ore were made in the prosecution of the various underground workings, and during the time the Rhosesmor engines were at work the owners were enabled to make extensive sales of lead at remunerative prices, but not having any pumping machinery upon the property as soon as an accident took place at the Rhosesmor Mine, where the water was heavy, the operations at Pen-yr-Orsedd were compelled to be suspended. There was an influential company got up some time since, with the Duke of Westminster as chairman, to continue the driving of what is called the Deep Level or Tunnel, hitherto undertaken by a company bearing the name of the Deep Level Company, which had for years been urging the work on in what I may call a primitive style—carrying on the levels, and driving about 5 or 6 yards per week, but since the company I have referred to was formed, with the Duke of Westminster as head centre so to speak, operations were begun by the Diamond Boring Company, and progress commencing at 20 yards per month has been increased to 100 yards per month, and we now find that, within three weeks, this great tunnel or water-course should be right into the Pen-yr-Orsedd sett. Well, as soon as that is accomplished there can be no doubt that the whole of the water will be drained off, and there will be a depth from the surface of 220 yards for levels to be driven and stoping ground to be laid open, so that the operations, so far as the company is concerned, will be confined to the prosecution of lodes already proved, and without the aid of any steam-power, the tribute payable to the Tunnel Company amounting to only 30*s.* per ton of lead raised. You are aware that the property adjoining (the North Hendre Mine) is now paying 40 per cent. dividend to the shareholders, and that a cross-cut is now being driven in a southerly direction from the eastern shaft at a depth of 122 yards, to prove one of the numerous veins traversing the sett, and we hope that in a distance of 6 yards this object will be attained, when there is every reason to expect that ore will be raised in large quantities, and as the working expenses are but small the profits will be considerable. This is not, as it were, a common speculation, or a property which has not been developed or tried. Our predecessors spent a considerable amount of money upon the concern, as I have told you before, and it is to be hoped that those who have taken shares in the undertaking, and those who will come forward if any appeal is necessary, will participate in a profitable working of the mine, and with the large extent of ground available there is every reason to anticipate that all that has been shadowed forth will be realised, and that it will be an addition to the great and valuable mines in the Halkin Mountain, which have proved the foundation of fortunes to a great number of persons.

The directors named in the prospectus—namely, Mr. E. J. Bartlett, Mr. George Hughes, Mr. John Lloyd, and Dr. D. G. Kennedy were then re-elected, and the proceedings terminated.

[For remainder of Meetings, see to-day's Journal.]

THE LATE MR. SAMUEL HIGGS, J.P.

The following account of the death of Mr. SAMUEL HIGGS, formerly of Penzance, and for some time Secretary of the Royal Cornwall Geological Society, will be of interest to many of our readers, to whom this gentleman was well known:—

We are sorry to have to record the death, at an early hour on Sunday morning, June 22, of Mr. Samuel Higgs, J.P., acting-superintendent of fire brigades, the result of a fall from a horse on the previous Saturday.

On that afternoon at about two o'clock Mr. Higgs obtained a horse at Messrs. Formby and Boase's yards, intending to go out for the purpose of watching the throw-off of the hounds, which was to take place at St. Leonards, Gleneig. When at the yards he selected a horse which was rather hard to manage, and Mr. Boase refused to let it go out. He ultimately lent a quiet animal which Mr. Formby was in the habit of riding. Shortly after leaving the stables, and on his way up Currie street, the horse shied near the hired dray stand, the result being that the rider's spurs pricked him rather deeply, when the animal commenced backing, and Mr. Higgs was unseated and fell with his head against the nave of one of the drays on the stand. He was taken up insensible and removed at once to the Wellington Inn, but Dr. Way, who was sent for, advised his removal to his own residence in Hutt-street. He was afterwards attended by Dr. Gardner, his regular medical adviser, who found that the skull had been severely fractured.

From the time of the accident but slender hopes of the patient's recovery were entertained, and about one o'clock A.M. on Sunday he breath-d his last. The case having been reported to the City Coroner (Mr. T. Ward, J.P.), enquiries were made into the facts connected with the sad occurrence, and, in addition to what we have stated, he learned from Mr. Boase, of the firm of Formby and Boase, that if he had known deceased had gone out with spurs he would have advised him to remove them, but that he was not in the yard at the time the unfortunate gentleman left it. After the facts had been enquired into, Mr. Ward considering that the accident had happened in the broad day and in the centre of the city, and that no one appeared blameable, decided that it was unnecessary to hold an inquest.

The deceased, who was 44 years of age, was long and favourably known in connection with the management of the Wallaroo Mines. After leaving the mines some time ago he came to Adelaide where he went into business, and afterwards took the position of acting-superintendent of fire brigades while the superintendent (Mr. A. J. Baker) went on the visit to Europe from which he has just returned. Mr. Higgs at the time of his death still held the position of acting superintendent which he filled with credit, and we understand that the members of the fire brigade intend to pay the last tribute of respect by attending the funeral, which is to take place to-day.

The deceased was a Fellow of the Geological Society of London, and had been appointed upon the Commission in connection with the representation of South Australia at the Sydney and Melbourne Exhibitions, in order that the colony might have the benefit of his peculiar knowledge in the collection of mineral specimens. He leaves a widow but no family.

The Cornishman enables us to give some particulars of the life of Mr. S. Higgs, jun., to which we have made some important additions:

Mr. Samuel Higgs, jun., was the second of the three sons of the late Mr. S. Higgs, merchant and mine purser, of Penzance, a zealous supporter of local industries and a thorough Cornishman. Born in Penzance 45 years ago, Mr. Higgs was educated at the grammar school of this town under the Rev. J. Morris, and on quitting that gentleman's care he assisted his father in the pursership of several mines and in his business generally. In 1855, Mr. Samuel Higgs, jun., went to the Crimea, on a visit to Dr. Dalby, R.N., his brother-in-law, and there he saw the business of war, as carried on by our soldiers and sailors. Among his father's oldest friends was the late Mr. W. J. Henwood, under whom Mr. Higgs studied chemistry and mineralogy, while he acquired a general insight into practical mining in the mines

of which his father was the manager. Through the Lake Superior district he travelled with Mr. Henwood, and wrote some papers on what he observed for our scientific institutions. On the death of the late Mr. R. Pearce consulships were offered Mr. Higgs. These brought him to the scene of many a shipwreck, and here his boldness and self-reliance became conspicuous. He was one of the brave fellows who, under Mr. Blackmore, rescued a crew from death after the Richard Lewis had been upset off the Eastern Green and some of her oarsmen nearly drowned. But scenes of hazardous activity did not take him from other public duties. He was elected to the town council, invited to take the honorary secretaryship of the Geological Society, was appointed a sidesman at St. Mary's, and in many other ways endeavoured to do his duty as a citizen. In the promotion of what sport or pastime was he not found? In races, regattas, fireworks, and especially in memorable local celebrations, Mr. Samuel Higgs was one of the *aides-de-camp* of Mr. Pearce, Mr. Colliver, and our generals in *fetes*. But from play he returned to study, and thought out for himself an improvement on the famed safety lamp of the great Davy, or rather a lamp which would burn for some time in an atmosphere of fire damp, under the influence of highly compressed atmospheric air.

Mr. Samuel Higgs, jun., also patented a process for accelerating the precipitation of copper from the water of copper mines, by driving steam over the scrap-iron in the cupriferous solutions. This process was used with considerable advantage at Wheal Margery, near St. Ives, of which mine Mr. Higgs was manager.

There came a time when mining was not as brisk as of yore, and a tempting offer was made our young townsman to manage the extensive and rich Wallaroo copper mines, in Yorke Peninsula. From that far-off district we heard of the same energetic, unselfish man—ever doing something for the amusement or improvement of the mine and the neighbourhood, always utterly regardless of himself. The raising of copper in these mines having been curtailed and retrenchments made, Mr. Higgs until something else offered, accepted the deputy superintendency of the Adelaide Fire Brigade.

FOREIGN MINING AND METALLURGY.

It is expected that Belgium will share in the improvement which appears to be taking place in the British and European iron trades, but at present the changes for the better are scarcely discernible. The administration of the Belgian State Railways has disposed this week of 10,000 tons of old Vignoles rails, at prices ranging from 3*l.* to 3*l.* 1s. 3d. per ton. These rails have been purchased for exportation to America; they will be used as ballast for ships carrying back empty casks of petroleum. Hitherto these empty casks have found purchasers in Belgium, but the market for them has become overdone. It is considered that in selling 10,000 tons of old rails at a trifle over 3*l.* per ton the administration of the Belgian State lines has made a good bargain. The erection has been commenced of the ironwork of the buildings intended to be used for the Belgian National Exhibition of 1880; the works do not appear to be carried on with much activity at present. A proposal is about to be made for winding up the South of Charleroi Blast Furnaces and Ironworks Company; a meeting of shareholders to consider the question is to be held September 20.

The French iron trade has experienced no material change. Prices have, however, shown firmness, and the trade is naturally benefiting to some little extent from the better tone now prevailing in the iron trade of Great Britain. An attempt made to sell the Zbirow (Bohemia) Mines and Ironworks, belonging to the creditors of Dr. Stronsberg, has resulted in failure. Another attempt at a sale is to be made Oct. 13.

There has been some little demand for domestic coal at Paris in view of the approaching winter consumption. The movement is encouraged by the low prices which at present prevail, and which induce householders to lay in supplies. We cannot say so much as regards industrial coal, in which there is very little business passing. In the Nord and the Pas-de-Calais business in coal is far from being in a satisfactory state, few orders for industrial descriptions being given out. The beetroot sugar manufacturers appear to be content to commence their season with the stocks of coal which they have already on hand, although the beetroot crop, without being of the first order, seems likely to be a satisfactory one. The Administration of the French State Railways has just let a contract for 900 tons of briquettes for use on the portion of the Orleans and Châlons Railway between Troyes and Châlons. The Prefecture of the Seine also let contracts on Thursday (Sept. 4) for the supply during 1880, 1881, and 1882 of about 30,000 tons of coal required for use in its workshops.

In the Belgian coal trade low prices are being accepted in order to assure sales, and no improvement has been established during the past week. M. Louis Gessiaux, who holds a high appointment in the Gardanne Mines (France), is having constructed in Belgium an apparatus which he styles the *Phanero-Grisoumetre*. The object of this apparatus is to reveal measure, and burn up to a great extent fire-damp, the presence of which in mines is too often the cause of terrible accidents. It remains to be seen whether the apparatus will fully respond in practice to the expectations of M. Gessiaux. The Gosson Lagasse Colliery Company commenced the payment on Monday of a first dividend of 1*l.* per share for 1879.

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week the markets have had an upward tendency, but business has not been very active, as usual in this holiday month. Trade is quiet everywhere, although the demand for raw and manufactured iron on American account is still a feature. After the bad times and stoppage of business it is satisfactory to see things are looking better. Trade in different parts of the world is improving, the demand for metals increasing, stocks clearing out, and as in everything else supply and demand must govern prices, so a great change for the better is expected soon, and has already set in. Tin seems to be the foremost metal at present, and lead also is looking up. The number of mines having been considerably reduced during the depression the demand must soon be far in excess of the supply. A demand will, no doubt, be stimulated for new properties, and those indeed are to be preferred to old or worn out mines. A recovery in trade is generally accompanied by a rush for mining, and with abundant and cheap money we should see a much brisker business in that department this autumn.

In shares of coal and iron companies Clyde have advanced 12s. per share on the week, Chillington 3s. 9d., Omoa and Cleland 3s. 6d., Monkland 2s., and Benhar 1s. 6d., while Ebbw Vale are 3s. 9d. lower. The demand for iron in America is now so great that their furnaces are unable to supply it, and large orders for raw and manufactured are being given out to English houses. Such an impulse was never more needed in the iron trade than at present, so it is causing great satisfaction, and shares of the leading companies are in good demand. The prices for iron are at present lower than ever known before, and below cost of manufacture under ordinary circumstances, so this improvement in the demand is certain to bring about a return to much higher values, especially as many furnaces have been stopped. Owing to the increase of pay conceded to the Lanarkshire miners a general increase has been made in the price of coal. The sales of the Scottish Australian for the past half-year have been 120,620 tons. The Wigan Coal and Iron Company (Limited) have arranged to put another furnace in blast at once. The firm have 10 furnaces, but for the last three years only four have been in work. Several large orders for pig iron have been received, sufficient to take the output of the five furnaces until the end of the year, and the firm now refuse further orders. Benhar shares have been firmer, and rose from 24s. 6d. to 25s. 6d., at which they are wanted. Glasgow Coal Exchange shares, 30s. to 50s.; Andrew Knowles and Sons are at 11½ dis. Ashton Vale, 70s. Bilbao Iron 6 per cent. (pref.), 25. Bolckow, Vaughan, A, 55 to 58; ditto, B, 29 to 30; ditto, stock, 98; and ditto 5 per cent. (pref.), 18¾. Cardiff and Swansea, 15s. Carnforth, 81. Charles Cammell and Co., 26 dis. Chillington, 42s. 6d. to 45s. Consett, 15¼. Ebbw Vale, 7½. Great Western, B, 30s. John Brown and Co., 35s. dis. Marbella, 29s. to 31s. Muntz' Metal, 12. Nerbudda, 5s. Newport Abercarn, 5. Parkgate, 28 dis. Pelsall, 11¼ dis. Rhymney, 17. Sandwell Park, 12½. Sheepbridge, 50½ dis. Scottish Australian, 36s. 3d. to 38s. 9d. Staveley, A, 5 dis. South Wales, 50s. Tredegar, A, 13. Ulverston, 10 dis. West Cumberland, 6½.

In shares of foreign copper and lead companies, prices have also been advancing. On the week Capé have improved 1*l.* per share, Rio Tinto 12s. 6d., ditto 7 per cent. and Panulcillo each 7s. 6d., and Tharsis (7*l.* paid) 1s. 3d. Tharsis old shares are unaltered, and have sold between 21⅞ and 22⅛. The latest report from the Yorke Peninsula Mines is very encouraging; the manager considers it the most important he has yet submitted, and there can be no doubt the company only want a rise in the price of copper to become very successful. Alamillos are at 30s.; Canadian, 6s. to 7s.; English and Australian, 25s.; Fortuna, 80s.; Linares, 80s.; New Quebrada, 40s.; Pontigbaud, 18; Rio Tinto 5 per cent., 73; Yorke Peninsula, 1s. 3d. to 3s. 9d.; and ditto (pref.), 7s. 7d. to 12s. 6d.

There has been more business doing in home mining shares, many of which have realised considerable advances in price. Tin shares have been most enquired for owing to the advance of 2*l.* in the price of the tin standard. Wheal Janes advanced to 50s., 60s., and are expected to go still higher, as the mine holds about 120 tons or more of stocked tin ready to carry to the smelting-house any day. Of course every rise in the price is so much clear gain to the company. South Crofty shares, which were worthless a month ago, have now improved to 15*l.*, and the lode in the cross-cut is said to be improved considerably. An important improvement is also reported at Wheal Crebor. Blwch United are at 20s.; Carn Brea, 31; Cook's Kitchen, 40s.; Cwm Brwyno, 20s.; Devon Consols, 40s.; Dolcoath, 31; East Caradon, 10s.; East Chiverton, 25s.; East Lovell, 35s.; East Pool, 14¼; Glasgow Caradon, 19s. to 20s.; Great Laxey, 16 to 17; Grogwinion, 60s.; Gunnislake (Clitters), 10s. to 15s.; Herodsfoot, 45s.; Hingston Down, 7s. 6d.; Killifreth, 3s.; Leadhills, 42s. 6d.; Marke Valley, 11s. 6d.; North Busy, 60s.; Phœnix United, 40s.; Pateley Bridge, 20s.; Roman Gravels, 8½; South Caradon, 55; South Carn Brea, 20s.; South Condurrow, 12; South Frances, 7½; Tincroft, 10½; Tankerville, 65s.; Temple, 20s.; West Basset, 97s. 6d.; West Chiverton, 3s. to 40s.; West Frances, 97s. 6d.; West Pateley Bridge, 50s.; West Tolgus, 26; West Seton, 17; Wheal Basset, 30s.; Wheal Peevor, 11; Wheal Kitty (St. Agnes), 7s. to 8s.; Wheal Uny, 1s. to 3s.

In shares of gold and silver mines, the principal business has been in Richmonds, which are 17s. 6d. per share higher, and touched 8¼. The mine is said to be improving, although the weekly return of $27,000 is certainly less. These shares are very fluctuating, having been as low as 4 and as high as 14 within a recent period, so investors require to be careful not to act at a wrong time in dealing with them. The produce at St. John del Rey for second division of August is 9750 oits., and yield 5·8. The returns from the Tolima Mine are expected to show an improvement in future. Australasian Mines are at 5s. Colorado United, 31s. 3d. Don Pedro, 10s. to 12s. 6d. Eberhardt, 40s. Exchequer, 2s. 6d. to 5s. Flagstaff, 3s. 9d. to 6s. 3d. Frontino, 40s. Javali, 5s. to 7s. London and California, 10s. New Zealand Kapanga, 5s. Pestarena United, 2s. 6d. to 5s.; ditto 12½ per cent. (preference), 17s. to 19s. Port Phillip, 8s. 6d. to 9s. Sierra Buttes, 35s. United Mexican, 45s.

In shares of oil companies, Young's Paraffin have declined 10s. per share, Oakbank 1s. 6d., and Broxburn 1s. 3d., but Uphalls have advanced 1s. 3d. Price's Patent Candle are at 8 to 9. Runcorn Soap and Alkali, 8 dis.

There is still very little doing in shares of miscellaneous companies. The London and Glasgow Engineering Company have recommended a dividend at 5 per cent., carrying forward 462*l.* Droitwich Salt are at 19s. 6d., Milner's Safe 8½, Palmer's Shipbuilding (B) 15¾ dis., United Limner's 25s. In wagon companies' shares prices are—Bristol, 55s. dis.; Bristol and South Wales, 6¼; Birmingham, 6 per cent. (pref.), 11; Gloucester, 6; Lancaster, 50s.; Metropolitan, 30s. prem.; Midland, 8¼; Railway Carriage, 70s.; Scottish, 8 to 9; ditto (new), 80s. to 85s.; Swansea, 27s. 6d.; and Western, 50s. In shares of chemical companies there is little alteration. Lawes' preference and ordinary shares are now dealt in ex div., the latter at 7 to 7¼. Langdale's, 60s. to 80s. Newcastle, 45s.

LAWES' CHEMICAL MANURE COMPANY (Limited).—The seventh annual report and statement of this company's accounts for the year ended June 30 last states that the sales of the manures show a falling off, being 265.092*l.* This is due to the general depression, which has seriously affected agricultural pursuits, by reason of bad crops and low prices, consequently consumers of the company's propucts have had to reduce their purchases, and the directors also in many cases have deemed it prudent to restrict business rather than incur too great risks at the present time. The gross profit is 24,190*l.*, from which and the previous year's balance of 12,040*l.* a dividend of 5 per cent. is to be paid on the ordinary stock and 7 per cent. on the preference stock, absorbing 16,729*l.*; 10,000*l.* is to be placed to reserve for reducing the plant and goodwill account, leaving 9501*l.* to be carried forward. The company has also had to contend against the excessive competition which naturally arises during a period of depression. The new plant at Barking is completed, and in good working order. The directors believe with a revival of trade they will be able to show in future results as satisfactory, if not still more so, than they have in the past.

ARNISTON COAL COMPANY (Limited).—This colliery is at present issuing debentures for three or five years to the limited extent of 5000*l.* The interest is 5 per cent., payable half-yearly. The company's subscribed capital is 65,000*l.*, of which 9050*l.* remains to be paid. The accounts for the three years ended September 28, 1878, show a free balance of revenue, after meeting all charges and interests, of 17,881*l.* This sum was disposed of thus—8500*l.* written off for reserve or depreciation account; 8856*l.* paid as dividends, being equal to about 6¾ per cent. per annum; and the balance of 525*l.* carried forward.

SHOTTS IRON COMPANY.—The meeting of this company is to be held on September 10, and the report states that owing to the continued depression in the iron trade there is a loss on the year's business of 3536*l.*, which is more than accounted for by the amount written off for fall in value of stocks of pig-iron and gas coal. After deducting this loss from the balance of undivided profits from previous year there is a balance of 4355*l.*, which the directors recommend to be carried forward.

METALLIC SULPHIDES REDUCTION COMPANY—Hollway's Patents—(Limited).—A company has been formed under this name to acquire and work the rights, &c., of Hollway's process of rapid oxidation, by which sulphides are utilised as fuel. As it is only a short time since we fully referred to the practical value and economical advantages of this process, no further comment on these points is necessary at present. It is anticipated that the process will be quickly adopted on a large scale, not only for reducing the cost of treatment of ores now worked by other methods, but also by enabling many mines to be worked where the expenses would otherwise be prohibitive. The deposits of such ores in Spain and other European countries, including Cornwall and other parts of the United Kingdom, are immense. The company will be allowed to work in the United Kingdom free of royalty. The enterprise is stated to receive the countenance of the St. John del Rey and other leading mining companies. The capital is 100,000*l.*, in 10*l.* shares.

WEST PATELEY BRIDGE LEAD MINE.—It would be noticed the news from this mine last week was unusually good. The lode in the 56 had improved considerably, and the manager reports that with two shots upwards of 8 tons ore was broken down. The mine was also visited by one of the Van directors, who says he never saw so fine a lode even in the Van, and the quality of the ore surpasses anything he ever saw. Although things have been very bad in the mining line for some time past, there are at last distinct signs of improvement, so that money may be invested safely, and there are not any shares likely to rise more than those of this mine.

The following calculations show the yield per cent. on money invested at present prices in the shares named, based upon the last average yearly dividends being maintained:—In shares of oil companies Dalmeny would yield 5; Oakbank, 10; ditto (new), 9⅛; Price's Patent Candle, 8⅜; Uphall, 5⅛; and Young's Paraffin, 7⅛. In collieries and ironworks shares Armiston would yield 6⅝; Bolckow, Vaughan, and Company, 6; Cairntable, 15⅜; and Muntz's Metal, 9. Among miscellaneous investments may be mentioned Phospho Guano to yield 3⅛; Scottish Wagon, 5⅞; ditto (new), 9; Tharsis Sulphur and Copper, 6⅜; ditto (new), 6½; and United States Rolling Stock, 5⅜.

Capital. Per share.	Paid up.	Dividends. Rate per cent. per annum. Previous.	Last.	Description of shares.	Last price.
				COAL, IRON, STEEL.	
£10	£8	£ 5	£ 5†	Arniston Coal (Limited)	6¼
10	10	4	nil	Benhar Coal (Limited)	25s. 6d.
100	60	25s.‖	25s‖	Bolckow, Vaughan, and Co. (Lim.)	A. 55
10	10	10	10	Cairntable Gas Coal (Limited)	6½
10	10	4s‖ April, 1876		Chillington Iron (Limited)	45s.
10	10	—	—	Clyde Coal (Limited)	45s.
28	20	10s‖ Dec., 1874		Ebbw Vale Steel, Iron, and Coal (Lim.)	75s.
10	8	nil	nil	Fife Coal (Limited)	7½
10	10	nil	nil	Glas. Port Washington Iron & Coal (L)	B. 60s.
10	10	—	—	Ditto, A	57s. 6d.
10	10	—	—	Lochore and Capledrae (Limited)	15s.
10	10	nil	nil	Marbella Iron Ore (Limited)	30s.
10	10	nil	nil	Monkland Iron and Coal (Limited)	33s.
10	10	nil	nil	Ditto Guaranteed Preference	50s.
100	100	nil	nil	Nant-y-Glo & Blaina Ironworks pref. (L)	16¼
6	6	nil	nil	Omoa & Cleland Iron & Coal (L. & Red.)	12s.
1	1	15	15	Scottish Australian Mining (Lim)	37s. 6d.
1	10s.	15	15	Ditto New	17s. 6d.
Stock	100	nil	nil	Shotts Iron	40
				COPPER, SULPHUR, TIN.	
4	4	—	—	Canadian Copper and Sulphur (Lim.)	6s. 9d.
10	7	72s 6d‖	60s‖	Cape Copper (Limited)	29
1	1	nil	nil	Glasgow Caradon Copper Mining (Lim.)	20s.
1	15s.	nil	nil	Ditto New	11s. 6d.
10	9¾	nil	nil	Huntington Copper and Sulphur (L.)	25s.
4	4	—	—	Panulcillo Copper (Limited)	30s.
10	10	nil	nil	Rio Tinto (Limited)	92s. 6d.
20	20	7	7	Ditto, 7 per cent. Mortgage Bonds	17½
100	100	5	5	Do. 5 p.ct. Mor. Deb. (Sp. Con. Bds.)	70
10	10	17½	16½†	Tharsis Copper and Sulphur (Lim.)	22/ 1s 3d
10	7	17½	16½†	Ditto New	14⅝
1	1	—	—	Yorke Peninsula Mining (Limited)	3s. 9d.
1	1	—	—	Ditto, 15 per cent. Guaranteed Pref.	10s.
				GOLD, SILVER.	
1	1	—	—	Australasian Mines Investment (Lim.)	5s.
5	5	10s.‖	7s. 6d‖	Richmond Mining (Limited)	8½
				OIL.	
10	8½	—	9	Broxburn Oil (Limited)	12/ 18s 9d
10	7	5	5	Dalmeny Oil (Limited)	7
1	1	15	20	Oakbank Oil (Limited)	29s. 6d.
1	5s.	15	20	Ditto	10s. 6d.
10	10	2	4	Uphall Mineral Oil (Limited) "A"	8/ 18s 9d
10	10	—	—	Ditto "B" Deferred	10
10	8½	17½	12½	Young's Paraffin Light & Mineral Oil (L)	12¼
				MISCELLANEOUS.	
50	25	5	6	London & Glasgow Engineering & Iron Shipbuilding (Limited)	18
7	7	5	nil	Phospho Guano (Limited)	5½
10	10	5	5	Scottish Wagon (Limited)	8½
10	4	5	5	Ditto New	55s.

† Interim. ‖ Per share. * For 1878. ‡ For 14 months.

NOTE.—The above lists of mines and auxiliary associations are as full as can be ascertained. Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them, and such information as can be ascertained from time to to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.

Post Office Buildings, Stirling, Sept. 4.

GREASE FOR LUBRICATING.—MR. P. M. CRANE, of Manchester, proposes to take petroleum residum or the oil which remains in the still after the distillation of the spirit and burning oils, or the oil as it comes from the wells with the more volatile portion distilled off, this residuum being usually a thick oil of dark colour capable of pouring from a vessel at a temperature of 60°, and of a specific gravity of 835 to 860, and agitate the same in a suitable vessel with strong sulphuric acid, and thus he produces a thick grease suitable for lubricating railway carriage axles and for other analogous purposes. Grease so produced after being washed with water or treated with alkali solution is of a light colour, and is useful for mixing with other materials commonly used in the manufacture of railway grease, or may be used alone as a lubricant. In carrying out the invention he prefers to keep the agitating vessel at a moderate temperature (say) from 80° to 100° Fahrenheit, and produce the agitating motion of the said vessel in any well known manner. He finds that a good result can be obtained with from 5 to 20 per cent. of strong sulphuric acid, more or less, according to the requirements of colour and consistency in the resulting lubricant or grease, and when he requires a thicker grease, or one with more body, he obtains or prepares a pretroleum residuum for the purposes of this invention with still more of the volatile portion distilled off and of a heavier specific gravity.

THE WILD DUCK, OR SPORTSMAN'S ARMS.

"'Tis no use to tell about it, comrades," says Old Tom, "for it is a true saying that 'good eating deserves good drinking.' We've had good eating, and if we enjoy moderate good drinking I should like to see the man that would try to hinder us. Everything was made for man to use, but not to abuse, and the man that can't guide hisself in a moderate way is wuss than a hoss or a cow, for when they've done drinking enuff they'll stop, but some men going about don't know so much as hosses and cows, and are forced to take the pledge to make them so wise as dumb beasts, and after a bit the find faut with every man that live like a reasonable human being, and take what is good for him, and no more, and don't put hisself on a level *below* the brute beasts." "Certainly," says Uncle Henny, "the man that can't guide his-self in all things is not equal to the beast of the field, and teetotalism will not make a man honest, or moral, or religious. It is a grand saying—'Let your moderation be known to all men.'" "But you forget," says Jan Jewill, "that many men are teetotallers as an example to others." "My dear Jan," says Uncle Henny, "the hang men as an example for others, but it don't prevent others from committing murder, and as we begun so we will end all our mittens. We will take what is good for us in eating and drinking, and stop like men when we've had enuff. Others may do what they've a mind to, and we shall do the same." "I heer'd say," says Jan Temby, "that part of Bolenowe was sold the other day." "It is very curious," says Cousin Will, "that Bolenowe, being in the south part of the parish of Camborne, should belong to the manor of Treleigh, to the north of Redruth. It is more curious still the way the name is spelt 'Bolina.'" The late Mr. Knight, of Redruth, was steward to the property for many years; he spelt it 'Bolenna.' The manor of Treleigh belonged formerly to Sir William Knighton, who was physician to George IV. The late Col. Drake, of Devonshire, a descendant of Sir Francis Drake, and Mr. Garden and the late Mr. Chadwick became owners by marrying the daughters of Sir W. Knighton. Nearly 60 years ago a steam-engine was erected on the mine, and then the spelling of the name was altered to 'Bolenowe,' and has remained so ever since." "I can mind it very well," says Jan Temby, "and tho' but very little was done I'm sure that Bolenowe bal is a good one. There was a little done on the old lode; an adit was extended hundreds of fathoms on it—nobody can tell when—from the Forest Moor west in Mr. Pendarves' land. The old burrows and some of the old working may still be seen; leats wor made, and the water brought in from Chycarne Moor to wash the tinstuff. Old Capt. Philip Richards, father of the late Capt. John Richards, manager of the Gwennap Mines, often told me that Bolenowe old bal was worked at the same time as Old Tye—now South Condurrow—and that the wor then the main tinworks in Camborne parish." "But the working you can mind, Jan, was for copper," says Jemmy Dowa. "To be sure it was," says Jan Temby, and the south lode, about 35 fms. south of the old lode, is so fine a lode as any man would wish to see, and it was a mystery it was never worked. I've seen slabs of mundic from it coated with black ore, and the lodestuff so rud as Cook's Kitchen. There is a world of tin and copper in that lode, and between the two lodes there is so fine a elvan-coose as there is in the county. West of Bolenowe bal, where the old burrows have been levelled and the fields tilled, I have seen curious 'old men workings.' Every bit of the lode worked away except a bit of a arch here and there to keep open the ground, and they arches wor rich for tin; the sides of the old levels wor smooth and greasy, and the workings went so deep as the could go without machinery. You may go over the same spot now, and see no more sign of old workings than there is on the palm of your hand, but they can be found. One engine would do for the sett, but it should be fixed—to do any good—near the boundary of the part of Bolenowe belonging to the manor of Treleigh and Mr. Pendarves' land; the two setts must be joined, and a grand bal will be found so sure as it is worked. The south part of South Frances was worked for a little while at the same time as the slight trial was made in Bolenowe bal, nearly 60 years ago." "I thought," says Jemmy Dowa, "that Mr. Lyle worked Bolenowe some years ago." "So a ded," says Jan Temby, but not the bal I've been telling ee about. He worked away north-east from the old bal, but what for I don't know; 'tes not in the run of any old workings, and no good wor done, so there wor a engine put up years ago on the tail end of Old Polgine lodes east, near Osborne's place, and the money was lost; if the put it to work the west end the would have found something good. It is a wonder such setts are allowed to remain idle, and the lords ought to insist on their being worked or given up." "The low price of tin," says Uncle Henny, "is all against it." "I tell ee," says Old Tom, "that the then bals will pay very well with the present price of tin if the keep it when they've got it, and don't leave it go to Gwythian Sands." "Perhaps," says Jan Jewill, "now there's a new owner for Bolenowe something will be done, and there is no doubt but he would soon get his purchase-money back again, with good profit, if he worked Bolenowe bal joined to Mr. Pendarves' ground." There was a time," says Uncle Henny, "and I can mind it very well, when big capns—great authorities in the days—said that no bals would be found to the south of Carn Brea and Carn Entral Hills." "And I heard," says Jan Temby, "one of the most noted managers of mines in Camborne parish say, when Capt. W. Thomas put up the first steam-engine ever seen in the Newton Moor, to work what is now Wheal Grenville and South Condurrow, that there was a lot of small strings of tin in the valley, and where they touched the granite they would all die away." "Depend upon it," says Old Tom, "it is a good thing that big men don't live for ever. If the ded, we should never have new bals, but I'm thinking, comrades, when I've got a new suit of clothes to go to the Institution in Camborne, and tell them about Bolenowe bal and the west end of Polgine, and if the won't hark to me and do something there I'll tell them to their face the don't know a bit more than the big manager that condemned Newton Moor."—*From Cousin Jack's Unpublished MSS.*

A SUCCESSFUL TRADES UNION.—The great Comstock lode in the Nevada silver mines is the *locale* of a powerful Union which has for a long time past dictated the rate of pay below which no man should work in the mines—$4 for a day of 8 hours. Out-of-door workers in the Sacremento valley only get $1½, with board for a day of 12 hours. As long as the rate within the mines was maintained, anybody was allowed to work there by the Union; but latterly its leaders had issued a ukase that no man should work there unless he could produce a card of membership; and this example has been followed by the Mechanics' Union of artificers employed above ground. Chinese labour, which in some of the metallic mines of the Western States has made a tolerable footing, has no chance in the Nevada mines, and even the Chinese labourers who constructed a large portion of the Virginia and Truckee Railway, which joined the Central Pacific, were driven off by the Union as soon as the line reached the district over which it held sway.

"Kainotomon" Rock Drill

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SUPERIOR AIR COMPRESSORS.

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PARIS, BRONZE MEDAL, 1867. ORDER OF THE CROWN OF PRUSSIA. FALMOUTH, SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was **121·30 metres, or 133 yards.**

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL: and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

These Machines possess many advantages, which give them a alue unapproached by any other system of Boring Machine.

THE McKEAN ROCK DRILL IS ATTAINING GENERAL USE THROUGHOUT THE WORLD FOR MINING, TUNNELLING, QUARRYING, AND SUB-MARINE BORING.

The McKEAN ROCK DRILLS are the most powerful—the most portable—the most durable—the most compact—of the best mechanical device. They contain the fewest parts—have no weak parts—act without SHOCK upon any of the operating parts—work with a lower pressure than any other Rock Drill—may be worked at a higher pressure than any other—may be run with safety to FIFTEEN HUNDRED STROKES PER MINUTE—do not require a mechanic to work them—are the smallest, shortest, and lightest of all machines—will give the longest feed without change of tool—work with long or short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or open work. Their working parts are best protected against grit and accidents. The various methods of mounting them are the most efficient.

N.B.—Correspondents should state particulars as to character of work in hand in writing us for information, on receipt of which a special definite answer, with reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL, IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

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ENGINEERS

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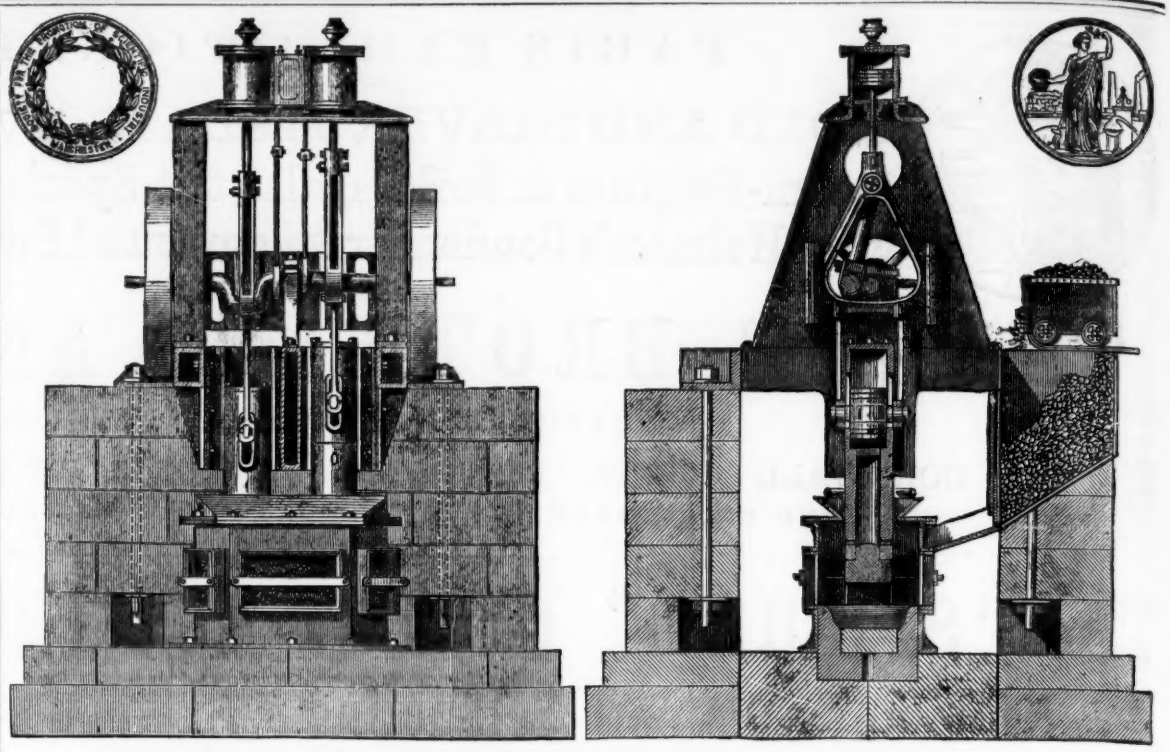


SHOLL'S PATENT DIRECT-ACTING PNEUMATIC STAMPERS,

For Pulverising Tin and Lead Ores, Gold Quartz, &c.,

SOLE MAKERS FOR CORNWALL,

N. HOLMAN AND SONS,

ST. JUST FOUNDRY, NEAR PENZANCE, CORNWALL.

ROTARY STAMPERS SUPPLIED ON THE SAME PRINCIPLE, ALSO WITHOUT STUFFING BOXES OR GLANDS, WHERE RUNNING GEAR EXISTS, OR WITH HORIZONTAL CONDENSING ENGINES AND BELTS TO DRIVE THEM, IF PREFERRED.

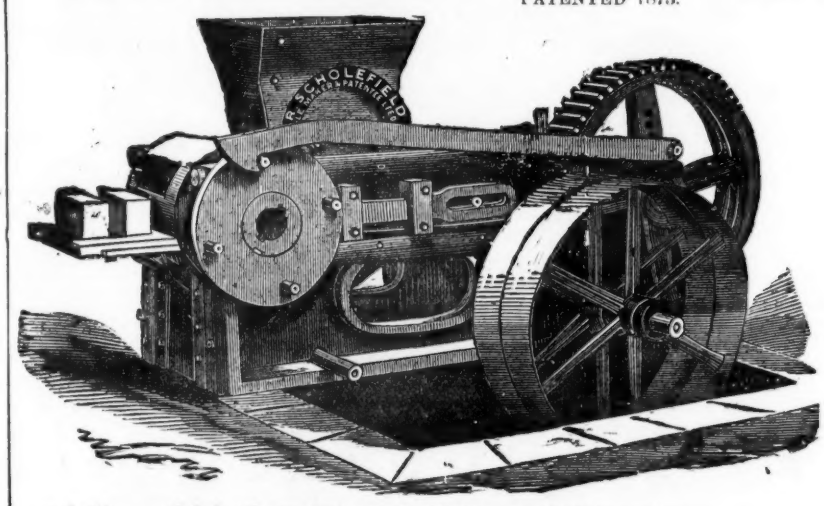
Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER.

MINING AND OTHER MACHINERY CONSTANTLY ON SALE,

NEW AND SECOND-HAND.

R. SCHOLEFIELD'S LATEST PATENT BRICK-MAKING MACHINE.

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his PATENT SEMI-DRY BRICK MACHINE, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which instead of storing at the pit's mouth (and making acres of valuable land useless) is at once made into bricks at a very small cost, by R. S.'s Patent Brick-making Machinery. If the material is got from the pit hill, the following is about the cost of production, and the hands required to make 10,000 pressed bricks per day:—

2 men digging, each 4s. per day	£0	8	0
1 man grinding, 4s. 6d. per day	0	4	6
1 boy taking off bricks from machine, and placing them in barrow ready for the kiln, 2s. per day	0	2	0
1 boy greasing, 1s. 6d. per day	0	1	6
1 engine-man, 5s. per day	0	5	0
1 man wheeling bricks from machine to kiln, 4s. per day	0	4	0
Total cost of making 10,000 pressed bricks	£1	5	0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

N.B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.

As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

SCHOLEFIELD'S ENGINEERING & PATENT BRICK MACHINE WORKS.

KIRKSTAL ROAD LEEDS.

JOHN WILLIAMS AND CO.,

WISHAW, SCOTLAND,

MANUFACTURERS OF ALL KINDS OF

Cut and Lath Nails; Joiners', Moulders', and Flooring Brads; Copper and Zinc Cut Nails; Colliery Plate Nails; Washers, Boiler Plates, Tube Strips, Sheet Iron for Galvanising and other purposes.

PRICE LIST ON APPLICATION.

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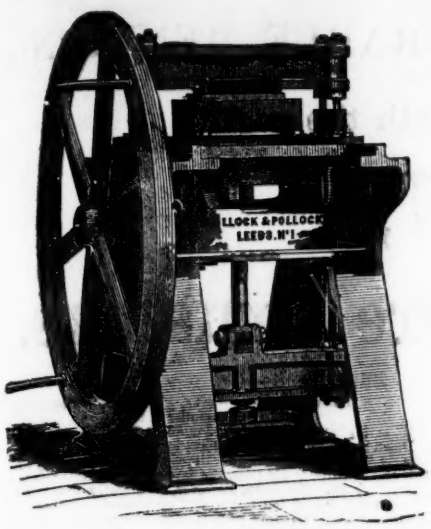
EDGE TOOLS, SPADES AND SHOVELS. HAND, SLEDGE, STONE QUARRY, AND MINING HAMMERS, RAILWAY CONTRACTORS' AND MINING TOOLS. AXES, ADZES, PICKAXES, CROW AND BORING BARS, WROUGHT-IRON WHEELBARROWS.

THE ORIGINAL AND ONLY MANUFACTURERS OF BEST CROWN QUALITY OF HORSE SHOES.

PATENTEES AND MANUFACTURERS OF PATENT PUNCHED EYE PICKAXES, HOES, HAMMERS, ADZES, AND OTHER TOOLS, Under Patent No. 4698.



POLLOCK AND POLLOCK,

LONGCLOSE WORKS, NEW TOWN, LEEDS,

POLLOCK'S PATENT BRICK PRESS,

The New "XL" Brick-Making Machines,

THE CHEAPEST AND BEST IN THE MARKET.

Improved Grinding Pans, with patent self-acting delivery.
Vertical and Horizontal Engines.

COLLIERY ENGINEERS.—WINDING ENGINES OF ALL SIZES.

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HADFIELD'S STEEL FOUNDRY COMPANY.

FIRST PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

ATTERCLIFFE, SHEFFIELD,

DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS,

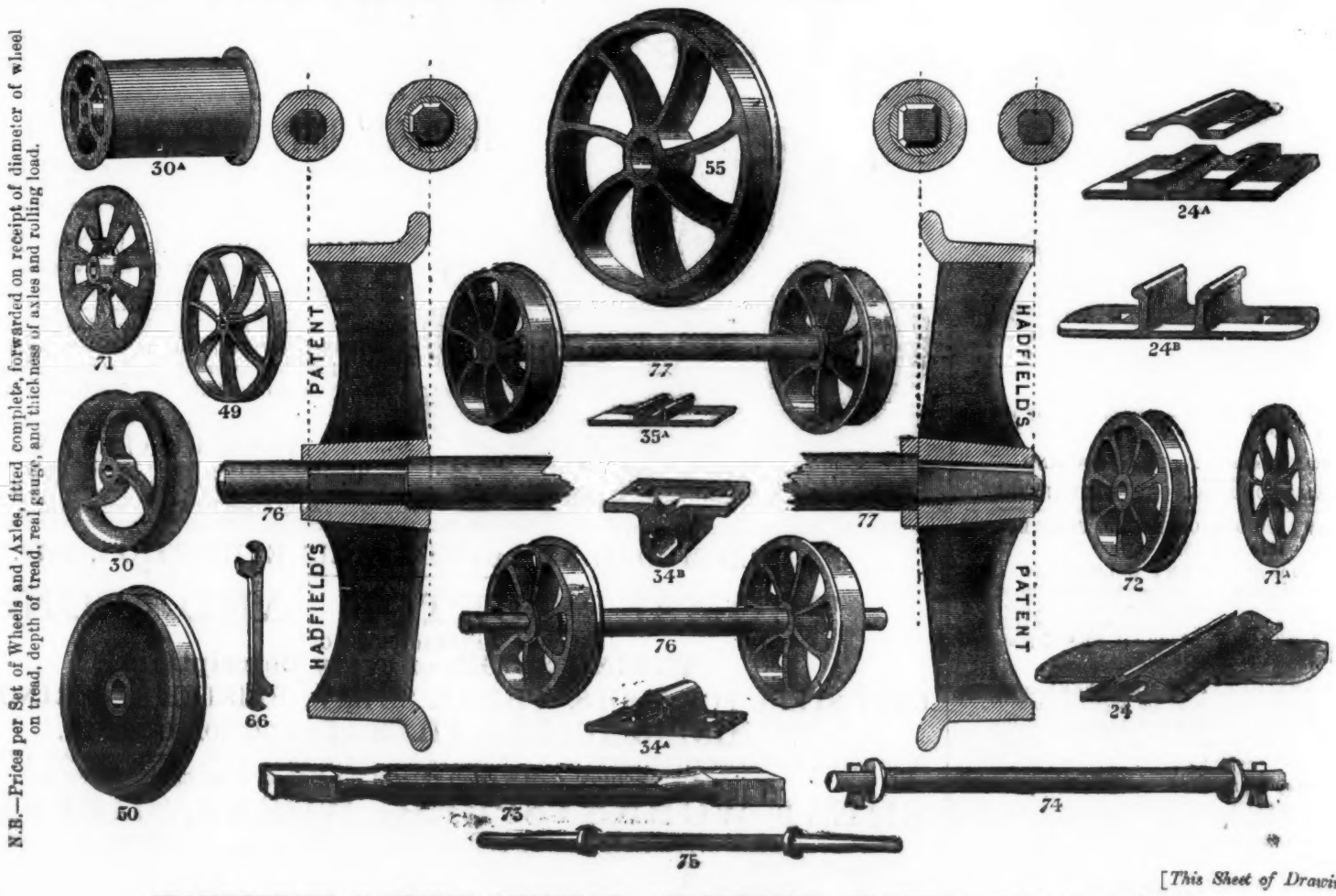
FOR

Engineering & Mining Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



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HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heaply fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

MACHINE MOULDED STEEL GEAR WHEELS OF EVERY DESCRIPTION.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors) at their offices, 26, FLEET STREET, E.C., where all communications are requested to be addressed. *September* 1879.